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ORIGINAL ARTICLES.

A PRACTICAL STUDY OF SERIOUS ABDOMINAL CONTUSIONS, WITH A CLINICAL REPORT OF TWENTY-ONE CASES.*

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During the past year (1894) a singularly large number of acute abdominal injuries of the non-penetrating variety have come under my care.

Taken as a group, they presented so many varied and unusual features it occurred to me that a short record of these, with a few others included, would supply a text for a brief study of that interesting and highly important subject, "Abdominal Contusions."

It was my intention at first to embrace within the scope of this review, as a preliminary portion, a series of experiments on the lower animal to be *en rapport* with the tendency of the times, and endeavor to support the clinical side by observations derived from pathological conditions deliberately produced.

This no doubt would lend additional interest and value to the subject, but on reflection I was finally convinced that the additional light imparted by this sort of inductional observation would not compensate for the trouble and the necessary amount of cruelty and suffering imposed. For without the infliction of very great force it would be impossible to rupture any part of the digestive tract of the dog, seriously lacerate the solid fixed organs or the large blood-trunks.

And though this were practicable under anæsthesia, as soon as reaction would set in acute peritonitis with agonizing distress must inevitably have followed. Furthermore, as every one knows who has had any experience in experimental abdominal surgery on the dog, his tissues are of a vastly tougher and stronger consistence and their recuperative energy far greater than in man, it is easy to understand that inferences derived from this line of investigation can at best possess but a relative value when applied to analogous vital structures of the human being. For these reasons it was decided to proceed on data derived solely, so to speak, from "human experimentation," from what knowledge could be gathered from numerous cases coming under my own care, which could be observed throughout from the time of injury until recovery or death; and in the latter event followed to the autopsy room, when the injured structures or viscera could be separately examined under the naked eye.

With a view of enhancing the value of these observations and giving them additional practical interest, the columns of several of the most noted authorities in surgery have been examined, and from them are copied their views and opinions as well as cases that have a pertinency to the subject here considered.

As the study of abdominal contusions is a large one, which to deal with by a systematic plan in full detail would carry one to a considerable length, in the present instance an effort will be made to condense and reduce it within such limits as will not cover too much ground and yet permit a fairly full exposition of it.

*Read at the annual meeting of the New York State Medical Association, October 10, 1894.

ANATOMICAL OUTLINE OF THE ANTERO-LATERAL ABDOMINAL WALLS, CAVITY AND CONTENTS.

The anterior abdominal parietes present a convex trapezoid elliptical contour, with an inward slope along their superior and inferior vertical and lateral planes.

If we draw a line from the insertion of the ensiform cartilage above to the symphyses pubis below, we will observe that as the free borders of the alæ thoracis spread outward above a conical outline is presented in the center, the base of which broadens as we descend to the navel, and from below upward the obliquity of the pelvis with the inward inclination of Poupart's ligaments contribute toward an inferior conical terminus, though not so sharply defined as the one above.

Now, if we intersect this vertical line through the center of the abdominal areas by another horizontal, passing through the umbilicus and carried as far back on either side as the inner margin of the erector spinæ muscle and midway between the last floating rib and the crest of the ilium, we will here observe that the lateral terminus on either side takes the form of a cone through the direction in which the outline of the ribs incline and the iliac border broadens as it descends. The transverse or horizontal diameter is slightly greater than the vertical, varying according to the peculiarity of build in certain individuals. Of the three great cavities, the abdominal is least invested by a bony structure. The quadratus lumborum, the psoas muscles, fascia, erector spinæ and lumbar vertebræ contribute a formidable protection from behind; so that concentrated traumatic force cannot often be transmitted posteriorly to the viscera within the peritoneum without serious damage of the lumbar vertebræ or the corda equina being first sustained. The abdomen is practically a large sac, which contains all the essential organs of digestion and excretion, if we exclude the lungs and integuments. This vast pouch is mainly protected and supported anteriorly and laterally by voluntary muscular tissue. The muscles pass in transverse and vertical directions and collectively constitute the "abdominal girth."

The digestive tube, which receives its solids, liquids and gases through the mouth and is drained by way of the rectum, chiefly occupies the abdominal cavity and is most exposed to injuries.

All the solid viscera here are best protected. Normally the greater volume of the liver rests under the shelving dome of the diaphragm, under the ribs on the right side. The spleen rises high under the ribs on the left side and is well protected in health, but the free edge of the liver projects downward in expiration on right or left side, and the spleen only when enlarged. The pancreas is a suspended organ behind the duodenum, resting on the aorta quite out of harm's way, except when such force is applied as first disorganizes the overlying parts.

In the standing attitude the kidney is a freely moving body, rising and falling an inch or more with each respiratory act. This lies behind the peritoneum, imbedded in loose fat on the psoas muscles close to the bodies of the lumbar vertebræ, which, though in spite of its protected position, is mostly exposed to trauma of all the solid viscera in the abdominal cavity. Large blood-trunks occupy the posterior abdominal walls, passing on to the lower extremities and from the alimentary canal to the liver. The ureters pass down behind the peritoneum to the bladder; and the thoracic duct which commences on the body of the second lumbar vertebræ and ascends upward through the aortic opening of the diaphragm. The common bile duct courses obliquely downward and inward along the side of the spinal column to enter the duodenum. If we view the lumbar wall as the lower base of support of the inferior abdominal viscera, which it really is in the recumbent position, it is interesting and important to note that it consists of two broad lateral hollows, separated by a prominent ridge of osseous structures, the bodies of the lumbar vertebræ.

PROTECTION AFFORDED THE ABDOMINAL CONTENTS BY THE COSTAL WALLS.

The subdiaphragmatic contents of the abdomen are most effectually protected by the arched domes of the thoracic wings.

It is important to remember that the apex of the diaphragm on the left side rises as high as the sixth intercostal space, or about one inch below the nipple-line, and on the right side to a point about one inch lower, and that posteriorly its summit is nearly on a level with the ninth in-

tercostal space. It is therefore apparent that the stomach in the empty state with the liver, spleen and gall-bladder are so sheltered by the lower segment of the thorax that when they are exposed to direct violence its primary impact is first encountered by the ensiform and the costal cartilages, the ribs, pleura and lung.

By this provision in the architecture of the economy, while the pulmonary organs are most exposed, those solid viscera lying under the diaphragm are spared. Hence why we will so often see costal fracture below the sixth intercostal space, with or without pleural or pulmonary complications, when the abdominal contents entirely escape.

The general muscular support of the abdomen is quite equally distributed, and protection is only defective at those points through which the umbilical vessels passed in fœtal life; and over the inguinal and crural planes are rendered defective through the evolution of anatomical development.

MUSCULAR WALL OF ABDOMEN.

The muscles investing the antero-lateral walls of the abdomen are strengthened, enveloped and anchored by powerful fibrous sheaths and a broad, strong tendinous aponeurosis. The muscles are so arranged that they pass downward from the thorax in the center and obliquely laterally.

In the male the abdominal cavity is wholly enveloped by muscles, except in the median line above the umbilicus, where the fibers of the recti diverge. Below the navel in females who have borne many children the internal borders of the recti at the linea alba are so widely separated that support is only maintained by the central aponeurosis. The principal central support of the abdomen is derived from the recti muscles. Each of these muscles is separated from the other by a dense fibrous septum and is enveloped by an investment of the abdominal fascia, which splits in two as it approaches its outer border, and then coalesces as it approaches the linea alba.

Thus the sheath of the abdominal rectus is more powerful and resistant for the volume of the muscle than any other met within the body. The action of the rectus abdominalis when the body is fixed is to actively compress the abdominal viscera (*a*) backward, (*b*) upward, (*c*) downward and (*d*) partly laterally.

When the muscles of the lateral walls act conjointly in contraction, the extent of intra-abdominal displacement is very great, in fact practically pushing the movable viscera up under the diaphragm, downward into the pelvis and backward along the lateral hollows of the spine.

We sometimes see individuals with such command over their abdominal muscles that they can flatten and depress the ventral convexity at will. If we observe the motions of the thorax while this ventral feat is being performed, it will always be noticed that abdominal collapse is simultaneous with a forced and prolonged expiratory act, the lungs rising high under the clavicles while the viscera follow upward the retreating diaphragm.

The oblique and transverse muscles, besides supporting and protecting the abdominal contents when the body is fixed, are capable of maintaining remarkable pressure on them. They are invested externally by a dense fascia, which above is continuous with the thoracic, below blends with Poupart's ligament, laterally with the lumbar fascia and with the linea alba. The coalescence of the external fascia abdominalis with the upper margin of Poupart's ligament is what produces that crease in fat people which runs across the lower side of the abdomen.

It has recently been claimed by a distinguished writer on anatomy that this depressed seam does not correspond with Poupart's ligament and is an unsafe guide in operations; that the ligament may be much lower than it, and the only safe guide to the ligament is by a line drawn from the anterior subspine of the ilium to the pubic symphisis.* But this is clearly an error and capable of misleading one not accustomed to manipulations on the living anatomy. Poupart's ligament rarely deviates in its course, and in all cases the under layer of the integument is more or less adherent to it.

The femoral arcade marks the inferior boundary of the three lateral muscles of the abdominal wall, and passing through their tendinous insertions is the inguinal canal, a portal which, when normally formed by augmentation of abdominal pressure instead of being opened, is all the more compactly closed. The psoas

*Keen in American edition of "Gray's Anatomy."

muscles on the inside, the quadratus lumborum and erector spinæ inclosed in laminæ of the lumbar fascia, covering the loin, form the posterior muscular boundary of the abdomen.

The abdominal wall is everywhere lined by a strong fibro-cellular membrane, designated variously according to the situation it occupies. Thus we have the fascia transversalis continuous with the pelvic fascia, the iliac and inner lamella of the lumbar fascia.

THE ABDOMINAL CAVITY.

This cavity possesses several distinctive characteristics.

1st. It is the least protected by an osseous envelope.

2d. Its serous membrane is of vast dimensions.

3d. It contains important viscera outside of its serous investment.

4th. It is ever varying in capacity.

Though apparently the most exposed to violence, by a moderate inclination of the trunk on the hips and a firm contraction of its overlying muscles, force is received and diverted on other less vulnerable parts; and thus its contents may escape serious damage.

CONTENTS OF THE ABDOMINAL CAVITY.

Exclusive of the renal organs, all of the abdominal viscera are more or less completely invested by the peritoneum.

The greater part of the cavity of the peritoneum is occupied by a hollow tubular structure, the alimentary canal, the greater part of which is tethered to the spine by the mesentery. This convoluted tube is constantly distended by air and by gases, elaborated in the chemical processes of food assimilation. The gaseous distention of the intestines floats them in a serous liquid of the peritoneal sac. With the pneumatic organs above, they aid in giving buoyancy to the whole body. In the event of contusion or sudden abdominal compression, these gaseous coils, by their mobility and resistance, serve to diminish and minimize its effects.

In the normal state, all the abdominal organs are in incessant motion. This is attributable chiefly to two influences: first, to respiration; secondly, to the small intestine, from pylorus to the ileo-cæcal portal, which by a continuous vermicular motion, called peristalsis, is in ever-ceaseless action, varying according to changing physiological conditions. The circulation of the blood must constitute another factor to intra-peritoneal motion by the powerful impulse transmitted by the aortic torrent, the steady upward current through the cava, the confluent tide through the large portal tributaries, and lastly the pulsation of those large arterial trunks leading to the great centers of digestion. The coils of the jejunum and ilium lie in close contact with the anterior and lateral abdominal walls, being separated only by the omentum and probably a very thin medium of lymph. The stomach when distended with food descends down as far as the umbilicus, lying rather to the left of the median line in nearly a vertical position.

The large intestine in its ascending and descending segment lies so far back as to be well protected. The caput coli in the right iliac fossa and the sigmoid flexure in the left are more exposed. The bladder, empty, is safely sheltered by the pubes, but when distended it rises into the abdomen, its anterior surface passing against the parietal peritoneum, while its fundus is inclined toward the sacrum.

The pregnant uterus rises up into the abdominal cavity after the fourth month. It is apparent from the foregoing that the arrangement of the abdominal viscera is ever undergoing changes under various physiological conditions and various circumstances in health, and it is well to remember that all these organs, under the vitalizing influences of life, are like so many independent beings in motion, their relation then and after death bearing but little analogy. Nor should it be forgotten that assymetry of development in the organs, variability in origin and direction, with altered relations of structure, are exceedingly common in the abdomen.

The serous membrane, investing the abdominal sac and its contained organs, is variously described by different anatomists, although their descriptions are usually so complex and intricate that nobody can clearly comprehend them. To briefly and accurately describe it in a few words stripped of superfluous verbiage, it may be said that it is quite identical to the synovial membrane of an articulation; that the peritoneal cavity is simply a joint in which move and play on each other the

organs of digestion. This joint is first invested with a parietal layer, and next all the contained organs are covered more or less by the same structure; except where they are attached.

It is a lymph sac, and its fluid, secreted, serves the purpose of a lubricant. Its structural study has been vastly complicated by that apron of tissue known as the omentum, the real purpose of which is yet unknown. But in this connection, what most concerns us is an acquaintance with the functions of the peritoneum.

In the average text-book on physiology, but little information is imparted on the vital properties of the peritoneum. It is important, however, that we become acquainted with some of these before its traumatisms are considered. In examining the contents of the peritoneum, we will notice that the ganglia of the solar plexus, the center of the great sympathetic system which provides the nerve supply of all the abdominal viscera, is lodged in duplications of this serous membrane, and that it is placed behind the stomach, in front of the aorta and the crura of the diaphragm. This vast plexus we will find receives the splanchnic nerves and branches from the pneumogastric. As its filaments spread over the viscera a separate plexus in various directions is formed and designated according to locality. This system presides over vegetable life and is concerned almost exclusively in the processes of digestion and nutrition, in metabolic and regenerative changes. This we can often demonstrate in inguinal colotomy, and in other instances when on division of it with the scalpel no pain is felt. But the basement membrane of the peritoneum of fibro-cellular tissue with the advent of inflammation becomes exquisitely sensitive. The peritoneal cavity has only an imaginary existence, for all the surfaces of the viscera within it lie in close contact; contraction and relaxation of the abdominal muscles regulating the extent of intestinal distention in health and confining the viscera in close apposition. As has been stated, normally all the organs invested by the peritoneum are in constant motion, but with the advent of inflammatory changes in its textures, as this extends into the muscular and glandular coats of the intestine peristalsis diminishes or ceases, and the secretory action of the glands or follicles is for the time reduced or wholly arrested. The bladder wall, as inflammatory processes are propagated into its tunics or the overlying expulsive muscles of the abdomen, is unable to contract and expel the urine. The peritoneum possesses marvelous plastic properties, so that on the slightest irritation being applied to any part of its surface it at once becomes adherent to the nearest organ.

Another salutary property of this great lymph sac is its remarkable facility to absorb fluids.

Moderate quantities of healthy urine, bile, chyle, pancreatic, gastric or intestinal juice or blood, are promptly resorbed by it without dangerous inflammation supervening. Enormous effusions of blood into the cavity of the peritoneum are quickly disintegrated and resorbed. It is equally competent to dissipate and take up the serous elements of local inflammatory action, and my experience has convinced me that it is equally potent in walling off, reducing, destroying and resorbing small foci of suppurative formation.

The abdominal viscera being abundantly provided with a vascular supply in the event of sudden commotion, are frequently the seat of hemorrhagic effusions. This may occur into the parenchyma of a solid organ through the vessels of the mucosum of the intestine, into the lumen through the capsule of an organ, extra or intra peritoneally. The kidney, of all the organs of the abdomen, the most frequently is the source of traumatic hemorrhage.

The blood may escape through its capsule into the loose retro-peritoneal tissues within the capsule or into the hilum and escape through the ureter. In occasional instances those types of hemorrhage may coexist. They are most frequently encountered in association with spinal injuries, though they do exist independently of cord implication, as a case demonstrates now in my service (July 23, 1894).

DYNAMICS OR PHYSICS OF THE ABDOMEN.

The abdomen provides the largest cavity in the body, which may be regarded as the laboratory of digestion, the center of never-ceasing chemical and vital changes. Its contained intestinal tube bears a striking analogy to the "worm" of a still, the only essential mechanical difference being

that the concentrated nutritive elements are taken up from its walls by vascular absorbents which collect and deliver them to the general circulation. The contents of the abdomen, as we have seen, are so effectually protected from behind that damage to its contents from this direction is rarely possible, however applied. Its broad muscular apron, its antero-lateral areas, are capable of offering great resistance to force when notice of it is given.

The hollow viscera of the alimentary canal containing semi-solid fluid and gaseous elements, its anterior central surface emits a tympanitic note on percussion, and is therefore capable of considerable compression when this is applied gradually. Compressed from one side or the other, the contents of the abdomen meet with but moderate resistance against the muscular parieties. In compression applied over its dorsal wall resistance is quite absolute and complete.

Force applied directly from before encounters but a limited resistance from the recti or oblique muscles, and passes inward until it is suddenly arrested by the vertebral bodies or by the sharp edge of the promontory of the sacrum. The summit of the abdominal cavity, that part immediately under the diaphragm, is most effectually sheltered by two pneumatic buffers, which so protect the organs in the epigastrium that their osseous braces, as a rule, fracture, and the lung with its serous investment suffers, while the abdominal viscera generally escape.

[TO BE CONTINUED.]

THE GENERAL PRACTITIONER'S KNOWLEDGE AND RESPONSIBILITY IN GYNECOLOGICAL TROUBLES.

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The gynecological specialist is the wonder of the medical nineteenth century. He is a thing apart, often made to order, and needs alcohol and glass to preserve him from the attacks of those who refuse to acknowledge him as the grand receptacle of all truths relative to women and their diseases. Where does he come from; what does he do; how does he do it and, most important of all, does he know how to do it?

The refined specialist comes from the ranks of the profession. It is not given any man to leap, ready-armed to combat any special disease, out of the arms of his collegiate alma mater medicinæ. Medical colleges give us the generalities of the science, not the specialties. True enough, we are now given a glimpse into the promised land of this or that branch of surgery or therapeutics from the standpoint of specialties, but it is as Moses gazed into that wished for country, and not as its possessor, that such knowledge is doled out. The general practitioner is a most maligned, long-suffering delver in the dross of disease, receiving little credit for his work, attainments and experience from most of those who ride above him on the fiery clouds of their own imagination. This is especially true of the made-to-order specialist, who, having no general knowledge or experience, does not see the need of it and therefore is not able to appreciate the man who has it. Many men can see no further than their own attainments nor reach into the field of others. This is especially true in the lines of many so-called specialists. What connection, they will ask, is there between this or that disease and the specialty in which I am engaged?

The whole truth is that there is just as much connection between a well-balanced knowledge of all disease and any specialty as there is a general relationship of all diseases of the economy, knowledge of which renders a man a fit practitioner of medicine. What would we say of a medical school whose professor of the practice of medicine lectured upon all diseases save that of the liver, because in his experience he had found hepatic troubles rare, or omitted brain diseases on account of the scarcity of the article, and so on through the category? In medicine and surgery we must put it down as in the exact sciences that no

knowledge comes amiss, that every fact and scientific observation is a clew or a key or a step toward some other fact, developed or latent, and that hence a general knowledge, or set, or series of facts are levers furnishing a fulcrum, or power, or place to stand upon for the digging out of new facts and making progress. Remembering all this, it is not easy to endure the opprobrium heaped upon the general practitioner, as a "hayseed," a "back number," a "mossback," a "far-away Moses" and the like. His experience is the foundation that all specialties are built upon; his knowledge is the basis of all refinement in the line of special work; his observations were the only foundations of the first specialists.

Who were the first specialists, I beg to inquire? Go over them on your fingers and see from whence their knowledge and skill of sterling rarity. How many of us to-day are on a par with them? Which of us can equal in a general diagnosis our Agnew or McGuire or Gross? And so on through the list. By whom were the early records of gynecology made? Who knows the plodding of McDowell, of the country practitioner Baynham? Who will say these men did not think and look and learn from their general work to reach out and successfully lay the foundations for all that is now received as the refined work of the best specialists? These men were types of all the pioneers in the line of accepted special work. Their knowledge was wide and varied. They were thinking men, taking nothing for granted because there was nothing to accept; thinking out their rules, testing them by reason and general experience and bringing them down to a special application.

How different all this is in the ready-made specialists. This one comes out an oculist without having seen or treated a score of cases on his own merits. That one an obstetrician, mayhap a professor, with a dozen or so cases to his credit. The successful removal of corns requires greater experience than this.

The general practitioner is, perforce of his relation to the family, bound to give much of his time and attention to the diseases of women and children. It must be remembered that women and children furnish the bulk of the work of the general practitioner, and hence his knowledge of these must be more than ordinary. To obstetrics his attention is necessarily drawn and consequently to the many problems and perplexities connected with it. If he is a careful man he must be an authority on the complications and their relation to many of the after-complaints of women and to their force as a causation of real disease. Hence it is that the general practitioner is likely to be good authority on many of the diseases of women, and particularly as to the presence of pathological conditions. Not that he is necessarily able to give positive surgical assistance in cases falling under his notice, but he is able to diagnose the presence of lesions requiring such interference.

Displacements of the uterus he at once recognizes and reduces. Or, finding the latter cannot be accomplished, he knows that adhesions have probably done their work, and he appreciates the necessity of more than ordinary treatment, because his own efforts have been futile.

He knows immediately, as Dunlap once so wittily said, that something is wrong because something is present which is not found in the anatomy. Observations and investigations must go hand in hand with previous exact knowledge. In all diagnosis what is should be weighed with what ought to be and the balance struck accordingly. Facts are facts. When we know the relatively normal conditions it is more or less easy to discover the abnormal. To the careful physician of long experience much that is written and talked these days about the value of this or that proceeding, the really ultra-refinements of presumed cleanliness will appear ridiculous. It is for him to sift each and every suggestion, to weigh it in the balance of positive experience and decide accordingly. If there is an atom of value in a suggestion, to get it out, appropriate it and make it useful is the way to make the foolishness of fools the wisdom of wise men.

Much of the work of gynecology to-day would be useless, or rather not needed, if every obstetrician were as careful as he should be in the handling of women coming under his care. A woman after parturition must neither be treated into disease nor be left in a condition to produce it.

Carelessness in the handling of women after miscarriage is a serious failing of many physicians. Broadly speaking, every woman after a miscarriage should have

the same careful attention as after confinement. She should rest, if anything, longer because the processes of labor are natural, those of abortion unnatural. In labor the placenta is most apt to come away entire, while in miscarriage it is prone to cling and give trouble. Retained placenta is the fruitful source of much of the trouble necessitating after-operation upon the pelvic organs, and is a prolific cause of subsequent menstrual derangement due to subinvolution, congestions, displacements and the like.

As to curetting in these cases, the rule for each individual case cannot be absolutely laid down. Generally speaking, it is best to avoid curetting if the discharges are not offensive, if the bleeding is only moderate and does not come on in gushes, and if there are no other indications, such as continued crampy pains after miscarriage. I do not often find it necessary to curette a uterus, but when I do I never make internal applications of carbolic acid or any other of the so-called stand-bys. I have come to consider all this as meddlesome surgery and do not sanction it. This position, bear in mind, is not a dogmatic assertion drawn from a small experience in such cases, nor is it due to a lack of observation of cases other than my own treated by escharotics, caustics and disinfectants. My opinion is a conclusion reached after a careful weighing of my own and others' experience.

Post-partum douches I consider as a safeguard rather than a necessity. Do not misunderstand me. In all this discussion we must reason together. Among you are men who have never seen a case of childbed fever in an experience of ten years, and whose routine treatment has been simple care and cleanliness without using a syringe. Others, no doubt, have seen an occasional case whose origin is now as much a mystery to them as is the origin of species. With such different experiences, opinions must vary as to the value of douching before and after labor. One view I have heard, and agree with in its philosophy, says: "If we are clean when we start and stay clean while we work, we will be clean when we stop." A post-partum douche is unnecessary. Unfortunately we do not all know how to be clean or to stay clean, and so ending clean may be uncertain. So to avoid risk the post-partum douche comes in as a prophylactic. The ante-partum douche is valuable to insure the cleansing of the parturient passages and saves possible infection of the eyes of the child. For this reason I advise the ante-partum douche. I know its value. The hot—moderately so—post-partum douche keeps us longer at the bedside of the mother, assists in the contraction of the uterus, and so is a safeguard against that awful complication of labor, post-partum hemorrhage, which I firmly believe should never occur. The douches should be mild and given carefully.

We naturally come to the consideration of the injuries to the mother, to wit, uterine and perineal tears. Injuries to the bladder are no longer frequent, thanks to the more general understanding of the forces of labor and the use of the axis-traction principle in the manipulation of the forceps. The old see-saw method of delivering women with the forceps, with a pull and a tug, with no other idea than to tear something away from her pelvis, is happily going out of fashion; not altogether gone, but going. Let me urge upon you the value of the axis-traction forceps, and at the same time I advise you to study carefully the advantages it gives us in the delivery of a woman, both for her own safety and that of the child. The subject cannot be here entered upon in detail, but I shall be happy to discuss it with you and to answer all queries on the subject.

Perineal tears are the commonest injuries met with, and are most likely to give both the doctor and his patient a deal of after-trouble. If not repaired, the woman is for a long time uncomfortable, and oftentimes her discomfort goes on to positive harm and renders her useless as an active member of the household. If the tear is through the sphincter, the filthiness of the condition is almost as bad as death itself to the cleanly woman. If the tear is but fascial, the drag and displacement of the uterus and bladder often produce most serious complications. A woman with her uterus sinking down between her thighs, or resting at the introitus vaginæ, is an object for the keenest commiseration. All this can be avoided by the early mending of the tears.

As a general rule cervical tears require special consideration. They should be stitched if relatively extensive, but it is to

be remembered that the simple contraction of the uterus often reduces what seems a serious laceration to one of comparatively small importance. Tears of the perineum ought to be mended as early as possible; not later than six or eight hours after the occurrence. This is true for two reasons: First, because they are more likely to heal, and, second, because a secondary or late operation taxes the patient with what seems an additional operation when the parts are more tender.

Again, if ether has been administered during the delivery, early operation makes a second administration of the anesthetic unnecessary, and this means a great deal to the patient. The suture material may be either silk or silkworm gut, preferably the latter. The ordinary short sewing-needle is all that is required, although the Emmet needle is better. The tear should be stitched up as any other wound, and should not embrace in the suture parts not injured. For this reason the old method of stitching from the outside when the tear is inside is all wrong. Tears in the vagina occur from the inside outward, and the stitching should be done in the same direction. If the tear extends into the bowel through the sphincter, it should be stitched carefully, as I shall demonstrate to you, to close the bowel. The ends of the sphincter muscle should be exposed and united, as I shall make plain. The so-called flap-splitting operations are to my mind not scientific in conception, and I believe the final verdict will be that they cannot stand the test of time. Too much care cannot be taken to not include too much tissue in any suture. When this is done strangulation necessarily takes place and of itself defeats union. By the inside vaginal sutures a deep vaginal bevel is produced and the parts are brought into their moral physiological relation, as may be seen on examination, for the anterior and posterior vaginal walls are in apposition.

The recognition of pelvic inflammatory conditions requires careful bimanual examination. The history of the case will help us out if thoroughly obtained, and the factors in all pelvic disease must constantly be held in mind. The gonorrhœal origin of much pelvic disease must not be forgotten nor underestimated. The history of difficult labors with succeeding inflammatory attacks, of miscarriages or abortions, must never be forgotten. As an inestimable factor in diagnosis, the bimanual examination must not be overlooked. It would be folly to expect to discover neoplasms, ovarian or inflammatory, if the normal relation, position and general contents of the pelvic basin are not thoroughly understood and distinguishable by examination. No careful general practitioner should lose opportunity to discover and map out all that is to be known of these. This being done, what is abnormal can generally be readily appreciated.

The history of ectopic pregnancy, its importance and frequent fatality, make it incumbent on all to study this subject carefully; especially to hold in mind the salient features of this condition. A long period of sterility, then disappearance of the menses followed by a stroke of shock and pain, with subsequent bleeding kept up for an indefinite period—these signs make the case suspicious. In every such case take every precaution to arrive at a correct conclusion.

Dermoid cysts often are at the bottom of much serious trouble in women, and are to be suspected in the presence of much and long-continued pain without other assignable cause. Suppurating dermoids are a prolific source of peritonitis and tumors; their position and size, with fluctuation and firmness combined, may lead us to suspect their existence.

Fibroid tumors and their removal is no longer a question of expediency. The operation is settled and is as safe as any other in surgery. The only question is when the tumor itself and when the ovary should be removed. In general terms the ovaries ought to be removed by election if the tumor is small and the woman is under forty years of age. After this period ovariotomy is of doubtful expediency and the tumor itself should be the operation of election.

You will see that in this paper I have tried rather to offer general advice than to go into a detailed description of any operation in particular. Special surgery requires special study, and the real specialist is the one who is ready to give the subject this time and study. But there are emergencies when every man must act by himself, and my object here is to suggest guiding points—how to proceed, where to stop. Otherwise the subject is too broad for an incidental society consideration.

COMMUNICATIONS.

THYROIDECTOMY IN THE TREATMENT OF GOITRE.

JOHN B. ROBERTS, M.D., PHILADELPHIA.

My object in bringing this topic before you is to call attention to the ease with which the enlarged thyroid gland can be enucleated and the mechanical symptoms caused by its pressure removed. After medicinal treatment has been employed sufficiently long to make it evident that no important change in size is to be expected, it seems to me that thyroidectomy need not be delayed.

Perhaps two months is as long as one need wait if during that time the approved remedies have been employed in full doses. It must be remembered that goitres not infrequently vary in bulk without relation to medicinal treatment; hence a diminution is not necessarily the result of the local or internal medication. If dyspnœa due to pressure on the trachea is marked, or if hoarseness from compression of the recurrent laryngeal nerves is present, one month's unsuccessful treatment by medicines would probably induce me to operate.

Parenchymatous injections of alcohol, tincture of iodine, or other irritants do not seem sufficiently successful or free from danger to be adopted as a routine, though cases may still come under my care in which I shall be willing to try them. Tapping or incision and packing of cystic goitre are available; but after the former the cyst is liable to refill, and the latter operation makes almost as much scar as, and is not much less serious than, thyroidectomy. Electrolysis does not seem to have given sufficiently certain results to make it attractive. Tracheotomy may be demanded when tracheal compression is marked, though in some cases subcutaneous or open division of the deep cervical fascia to allow the bronchocele to bulge forward will avert the threatened suffocation.

Division of the thyroid isthmus to lessen pressure, or ligation of the thyroid arteries to cause atrophy or prevent increased growth, are operations almost, if not quite, as serious as removal of a portion of the diseased gland.

I now speak only of thyroidectomy, or removal of a portion of the thyroid gland. Total extirpation is unwarranted, because the occurrence of myxœdema as a result of the entire loss of the thyroid gland is pretty well established, experimentally and clinically. The most disfiguring and most compressing part of the goitre may be removed, and a portion of one lobe left to carry on the function of the gland. I would do this even if the part left was apparently not healthy to the naked eye. It seems pretty well established that a small portion of the gland, or a small accessory gland, if such be present, is sufficient to avert the occurrence of myxœdema in patients subjected to removal of goitrous masses.

Thyroid feeding, the administration of thyroid extract, or the implantation of the thyroid gland of one of the lower animals, in the connective tissue or the peritoneal cavity of patients previously subjected to extirpation of the gland, may overcome the tendency to myxœdema; but until this is really proved the surgeon should do only a thyroidectomy, and leave a portion of the gland in position.

I shall not go over the steps of the operation in detail, as they are sufficiently clear to any operator who is prepared to deal with sharp hemorrhage and who is careful enough to avoid injuring the recurrent laryngeal nerves. A vertical incision is made in the median line of the neck or above the most prominent part of the tumor, and the necessary portion of the fibroid, cystic or hypertrophic gland enucleated. Perfect asepsis or antisepsis is essential.

The enlarged thyroid in exophthalmic goitre has been subjected to operation, but the general character of this affection would deter me from operating upon the bronchocele, which is only one symptom of the disease; unless further statistics show its value in an unmistakable manner.

I add the reports of two cases to illustrate the subject. Neither goitre was of great size, but both were annoying to the

patients. They were radically cured by operation. The enormous fibroid goitres seen especially in Europe would, of course, be more difficult to deal with, especially in regard to the control of bleeding.

CASE I.—Single woman, aged twenty-one, with a family history of phthisis; first noticed enlargement of the thyroid gland when she began to menstruate, at the age of thirteen. The enlargement rapidly increased for three years, when it began to press upon the trachea to such an extent that respiration was interfered with, and she was obliged to give up going to school because of the dyspnœa that occurred while walking. After the lapse of a year the bronchocele began to diminish in size, but for the past three or four years had not changed much in bulk.

The patient had been under medical treatment for some time for the thyroid enlargement, without diminution in the growth; and I therefore determined, in April, 1891, to excise the most prominent portion of the gland. A four-inch incision was accordingly made in the median line of the neck over the most prominent portion of the enlargement. The middle lobe or isthmus of the gland was first enucleated, and I subsequently removed the entire right lobe. In the removal the sheath of the common carotid artery, with the descending branch of the ninth nerve upon it, was clearly exposed to view. A portion of the left lobe of the gland was then enucleated, making the size of the mass removed about that of a closed fist. The arteries requiring ligation were quite large and numerous. Sublimate gauze dressing was applied with considerable pressure in order to avoid oozing.

About half an hour after the operation the patient became so cyanotic from the pressure that the dressing, which had become saturated with blood, was removed. Her pulse became rapid and weak, but the removal of the dressing, the application of hot water, the administration of digitalis and other restoratives were followed by cessation of bleeding and quick reaction. A clean dressing was immediately applied. The next day the patient was in good condition with normal temperature. The wound healed promptly without suppuration or marked swelling. The patient was sent to the seashore about three weeks after operation with the wound healed, though her voice was quite husky. This was probably due to interference at the time of operation with the recurrent laryngeal nerve.

The woman has been seen repeatedly since operation, the last time being nearly three years from the date of the thyroidectomy. Her health has continued good; her voice has recovered its normal quality, and there is no evidence whatever of myxœdema. It was because of the fear that myxœdema might occur that I allowed a portion of the left lobe of the enlarged gland to remain. The goitre seemed to be of the ordinary hypertrophic variety, though no microscopic examination was made. The contour of the neck is now almost perfect, except for the unimportant scar; and there has been no further growth in the portion of the gland allowed to remain.

CASE II.—A young man, seventeen years of age, had noticed two years previously a small swelling in the front of his throat, about an inch and a half to the right and some distance below the Adam's apple. The tumor was not painful, but steadily increased in size until at the time he came under my observation there was some interference with respiration. He came to Philadelphia for the purpose of having the growth removed a year ago, but the surgeon who examined him advised against operative interference. When I first saw him, in November, 1892, the patient was the subject of a well-marked goitre. The girth of his neck over the most prominent part of the tumor was 15¾ inches. The enlargement involved both lobes of the thyroid gland, but the right was larger than the left. Stridulous respiration was marked, even when he was perfectly quiet and not taking any exercise. Breathing became easier as soon as the growth on the right side was pushed away from the trachea. This phenomenon I repeatedly tested, and it was very marked. Above the main mass on each side was a small nodule, somewhat separated from the rest of the tumor, but evidently being the upper portion of the lobe on the corresponding side. There was a well-marked groove between the two lobes, showing little involvement of the isthmus, and a furrow between the upper nodule and the main mass on each side. There was no exophthalmus, but there existed a doubtful systolic murmur. I treated the patient for some weeks with digitalis and quinine, with ointment of

the red iodide of mercury and lanoline externally, and subsequently with fluid extract of ergot.

After a month's treatment I determined to remove the prominent portion of the gland, which was making pressure upon the trachea. The patient took ether rather badly, as was to be expected from the interference with the respiration due to the growth. The right lobe of the tumor was exposed and was found to be cystic. The cyst was opened, and about an ounce and a half of dark-brown fluid was evacuated. The small nodule above and the right lobe containing the cyst were dissected from the underlying structures. The sheath of the carotid artery was exposed, and the lower portion of the mass extended close to the sheath of the subclavian artery.

Stridor was apparent after the operation, and some dyspnœa remained, which was, however, relieved to a considerable extent by loosening the bandage. Four days later the dressing was removed. Union by first intention seemed to have taken place. A dressing of gauze and collodion was applied, and on the sixth day after operation the patient was allowed to get up. Four days later a slight hemorrhage occurred through the gauze and collodion dressing as the result of a fit of coughing. Slight oozing took place for a couple of weeks through the opening made by the giving way of the union at this time. The blood-clot contained in the cavity left by the excision of the right lobe of the gland did not break down into pus, but gradually became organized. The patient's temperature was normal during nearly the whole of the convalescence, though at one time shortly after the operation it rose to 101°. The patient was discharged about five weeks after the operation. His breathing had become normal and the appearance of his neck was greatly improved, though there was still, of course, enlargement of the left lobe. There was no hoarseness remaining as the result of the operation, as in the former case.

A year later the patient wrote to me that he had had no trouble in breathing, that his voice was normal, and that there was no change in the appearance of his neck. The operation, therefore, was in every way satisfactory.

A REPORT OF FOUR CASES OF DIPHTHERIA TREATED BY ANTITOXINE.

GEORGE A. MUEHLECK, M.D., PHILADELPHIA.

The employment of pure cultures of pathogenic microörganisms and their toxic products for purposes of immunization, as well as for combating certain infectious diseases, is comparatively of recent date. The history of the labors of Pasteur, Koch, Kitasato, and others in this field has become common property for the entire medical world, so that a mention of them here would be superfluous; but their work has opened up new avenues of investigation and research which have already yielded practical results, as it seems, of the most far-reaching consequence, and a promise of still greater achievements in the future. I refer here especially to the work of Behring, Ehrlich, Brieger, Wernecke, Boer, Schuetz, Kitasato, Wassermann, Kossel, Aronson, and others in Germany, Roux and Yersin in France, and Tizzoni in Italy, as a result of which the doctrine of immunization against certain infectious diseases has been further elucidated and experimentally confirmed on animals at least. Behring and his colaborer were the first to show that the blood or milk of animals so immunized has the power when ejected hypodermatically, or into the peritoneal cavity, to immunize other animals or to protect them from the consequences of inoculation of virulent cultures of pathogenic microorganisms or intoxication by the products of the same species with which the first animal was made refractory. In other words, the milk and blood-serum have developed antitoxic properties which have the power to neutralize the toxic action of the virulent cultures and their products. This neutralization of the toxic by the antitoxic principle takes place even outside of the animal economy when mixed

in a test-tube in obedience to the laws of proportion (Behring, "Gesamte Abhandlungen ueber Disinfection, Immunisirung, Blutserumtherapie"). Animals which have been made ill by the injection of fatal doses of virulent cultures of their filtrates are restored to health if a sufficient quantity of antitoxic serum be injected within a stated time (Behring, "Blutserumtherapie und die Immunisirungsmethoden zum Zwecke der Gewinnung des Heilserums," 1892). Of the infectious diseases which have been the subjects of this line of investigation, and in which the results have been most encouraging, tetanus and diphtheria, and, to some extent, streptococcus infection, are preëminently to be mentioned. Of these, however, only diphtheria is relevant to this paper; but the principles involved are the same in all. Behring's method of securing antitoxic serum of diphtheria for therapeutic purposes is similar to that now generally accepted by all investigators—that is, by injecting hypodermatically into an animal gradually increased doses of attenuated dead cultures of Klebs-Loeffler in order to effect a certain degree of basal immunity. Subsequently this basal immunity is intensified by injecting increased quantities of living and virulent cultures.

This method is based upon the fact already established by the investigations of Koch and Katasato, viz., that specific toxine and antitoxine neutralize each other immediately outside of the living organism when mixed in the test-tube in obedience to the law of proportion. Formerly toxine and antitoxine were injected separately, but owing to variations for absorption exact results could not be obtained. Now they are injected together. For the practical application of the method it is best to use a test-toxine, the immunizing power of which has been tested and which is derived from more mature bouillon culture, to which has been added ½ per cent. of phenol. Of the solution used by Behring and his co-laborers as a test poison, 0.3 c.c. represents the minimal fatal dose of 1,000 gms. body-weight; 0.8 c.c. of this solution is injected into an animal weighing 200 to 300 gms., together with the substances to be tested for the antitoxic power in decreasing proportions.

For example, 0.4 c.c., 0.3 c.c., 0.2 c.c., etc. The result can be determined approximately in twenty-four hours, and with accuracy in forty-eight hours, by the presence or absence of local œdema; provided that the proportions of the material to be treated for the antitoxic power have been properly measured. The quantity necessary to neutralize 0.8 of this test-toxine will vary according to the amount of antitoxine present. These injections are made *seriatim*, and always give absolutely reliable results. As a final result of their labors these investigators have animals of whose serum 1½ mlgms., or of whose milk 0.075 mlgm., are sufficient to neutralize 0.8 c.c. of this normal toxic solution. A serum is said by Behring to represent 1 antitoxine normal if 1.0 c.c.: 100 body-weight is sufficient to neutralize 0.8 c.c. of this normal toxic solution—that is, if 0.8 c.c. of this toxic solution is injected into a medium-sized guinea-pig (about 500) it will remain well if normal antitoxic serum in the proportion of 1:100 body-weight (about 5 c.c.) had been injected one-quarter hour previously (Behring, "Gesamte Abhandlungen," etc., ii, p. 323). In this manner serum has been obtained representing sixty and more antitoxine normals (Kossel and Wassermann, *Deutsche med. Wochenschrift*, 1894, No. 16, "Ueber Gewinnung und Verwendung des Diphtheritschen Heilserums") in Koch's Institute, Berlin.

Roux, who began his experiments in 1891, uses for purposes of immunization a test poison, 0.1 c.c. of which will kill a guinea-pig of 500 gms. in twenty-four to forty-eight hours. His test poison is accentuated with a solution of iodine (liq. de gram.). He gradually increases the dose by diminishing the proportion of iodine. After several weeks it is given pure. In this way very powerful antitoxic serum, with an immunizing power of 1:50,000, is obtained—that is, a guinea-pig will resist 0.1 c.c. of recent virulent cultures if serum in proportion of 1:50,000 body-weight is injected (*Annales de l'Institut Pasteur*, No. 9, September, 1894).

Since the beginning of the year 1894 antitoxic serum has been extensively used in cases of diphtheria in the hospitals of Berlin and Paris. Henoch, Heubner, Koch, Kossel and others testify to its absolute harmlessness even in doses of 90 c.c. In no instance was any irritation of the kidneys or any unfavorable influence on the general health observed

(Behring, "Gesamte Abhandlungen Disinfection," "Disinfection, Immunisirung, Blutserumtherapie"). In six Berlin hospitals 220 cases were treated, with 76.4 per cent. of recoveries. Among these were 67 tracheotomies, with 37 recoveries—that is, 51.1 per cent. The beneficial effect of the treatment was most apparent the earlier it was begun. Of 6 treated the first day, all recovered—that is, 100 per cent.; of 66 treated the second day, 64 recovered—that is, 97 per cent.; of 29 treated the third day, 25 recovered—that is, 86 per cent.; of 39 treated on the fourth day, 30 recovered—that is, 77 per cent.; and of 23 treated on the fifth day, 13 recovered—that is, 56 per cent. (*Deutsche med. Wochenschrift*, Nos. 22, 23 and 24, 1894; *Berlin klin. Wochenschrift*, 1894, No. 29).

Roux, in Paris, reports a mortality of 24 per cent. in the Matérnité, while the mortality in the hospital of Trosseau, where no serum was used, was 60 per cent. during the same epidemic. Owing to the fact that the quantity of serum available in this country has hitherto been very limited, a report of the following four cases treated by this method may be of interest.

CASE I.—H. C., five years old, male, was taken ill on October 18th.

Status præsens. Mucous membrane over tonsils and posterior pharynx red and congested; small spots visible over tonsils; breathing somewhat labored; cervical glands swollen; pulse, 108—strong and regular; temperature, 100⅘°; respiration, 24.

October 19th, A.M. General condition about the same; membranes have extended; breathing more difficult; temperature, 100⅘°; pulse, 108; respiration, 24. At 8.30 P.M. injection of 1 c.c. of antitoxine—Schering—near scapula.

20th, A.M. General condition much improved; temperature, 99°; respiration, 24; breathing very much easier. P.M. Condition not so favorable; breathing very difficult; retraction of epigastrium and supra-clavicular spaces during respiration; face somewhat cyanosed; pulse, 130; respiration, 24; temperature, 100°. Intubation or tracheotomy seems indicated. At 8.30, second injection of 1 c.c. antitoxine—Schering—near scapula.

21st, A.M. Breathing much easier; temperature, 99°; pulse, 100; respiration, 20; general condition much improved. P.M. Heart weak, somewhat irregular; temperature, 99⅘°; pulse, 100; respiration, 20.

22d, A.M. Heart somewhat stronger. Examination of urine showes traces of albumin, specific gravity 1020; no casts. Membranes present a dirty pultaceous appearance, and can be easily removed with a probe. P.M. Pulse regular, 78; temperature, 99⅖°; breathing easy.

23d, A.M. *Status idem.* P.M. Temperature, 99⅘°; respiration normal. Membranes have disappeared; urine negative. From this day on convalescence was uninterrupted. The temperature gradually fell, and was normal on the seventh day.

CASE II.—M. D., six years of age, was seen by me October 3d. Extensive membrane on tonsil and soft palate. Temperature, 102°; respiration, 22; extensive tumefaction of glands; no involvement of the larynx.

October 4th. Membranes have extended over post-pharyngeal wall. Pulse, 110; temperature, 102½°; general condition depressed.

5th. *Status idem.* No antitoxine being available, the treatment followed the ordinary rules of practice.

To report this case *in extenso* would therefore be of no interest. The general condition of the patient remained bad until his death, which took place suddenly on the twelfth day of his illness. No antitoxine had been used in this case.

CASE III.—Mary D., eleven months old, was taken ill on the 26th of October with diphtheria. No antitoxine available; death on the 28th.

CASE IV.—John D., five years old, taken ill on October 27th. Membranes begin to form over tonsil and soft palate; pulse, 108; respiration normal; no involvement of the larynx.

October 28th, A.M. Injection of 1⅓ c.c. of antitoxine (Schering) near scapula; pulse, 108, regular; temperature, 102°; respiration normal. Extensive membranes over tonsils and soft palate; general condition depressed; urine negative. P.M. Temperature, 99⅘°; pulse, 108; membranes have not extended; general condition better.

29th, A.M. Temperature, 99⅖°; pulse, 108; membranes have a pultaceous fatty appearance and can be partly removed with probe; general condition good. Inoculated culture-tubes and sent them to

Dr. Ravenel, of the Hygienic Institute of the University of Pennsylvania, for examination. P.M. Temperature, 101°; pulse, 150; general condition less favorable; membranes presented a dirty yellow appearance.

30th, A.M. Pulse, 102; heart weak; temperature, 100⅘°; general condition fair. Dr. Ravenel reports vigorous growth of Klebs-Loeffler bacilli. P.M. Temperature, 99⅘°; pulse, 106, irregular; membranes coming away; general condition good.

31st, A.M. Temperature, 99°; pulse, 102, regular; throat almost clean, with exception of patch over right tonsils. P.M. Temperature, 99⅘°; pulse, 98, stronger.

November 1st, A.M. Temperature, 99⅘°; pulse, 98, normal. Urine negative. P.M. Temperature, normal; pulse, 96, strong; throat clean, with the exception of a small spot on right tonsil.

From this day on convalescence was interrupted only by a slight rise of temperature on the evenings of November 2d and 3d. Culture-tubes inoculated on November 6th and submitted to Dr. Ravenel for examination still show growths of Klebs-Loeffler bacilli.

CASE V.—Willie D., aged four years, was taken ill on the morning of October 28th; temperature, 101⅘°; pulse, 106; pultaceous spots on tonsils; cervical glands enlarged. Injection of 1 c.c. of antitoxine (Schering) near scapula. P.M. Pulse, 110; temperature, 101°. Pseudo-membrane has extended somewhat; larynx not involved; general condition fair.

October 29th. Temperature has fallen to 99°; pulse, 108; no extension of exudation in throat; general condition good; culture-tubes inoculated and submitted to Dr. Ravenel for examination. P.M. Temperature, normal; pulse, 146; heart weak; general condition not so good; no extension of membranes; urine contains traces of albumin and excessive phosphates.

30th, A.M. Temperature, 101⅕°; pulse, 116; heart weak and irregular; membranes have not extended, of a dirty-yellow appearance, can be removed with probe. Dr. Ravenel reports vigorous growth of Klebs-Loeffler bacilli. P.M. Temperature, 100°; pulse, 116, weak; general condition fair.

31st, A.M. Temperature, 99⅕°; pulse, 120, irregular; heart weak; membranes disappearing; urine contains traces of albumin. P.M. Temperature, normal; pulse, 102; heart still weak.

November 1st, A.M. Temperature, normal; heart weak; general condition fair. P.M. Temperature, normal; pulse, 117; heart weak.

2d, A.M. Temperature, 99°; pulse, 102; heart stronger; general condition good; throat clean; urine negative.

From this day on convalescence was interrupted by a slight rise of temperature, reaching 99°. Culture-tubes inoculated from throat on November 5th and examined by Dr. Ravenel were negative.

CASE VI.—The fifth child of this family, a little girl two years of age, remained apparently well. Her throat, however, showed a slight diffused redness. In this family of five children, who had freely commingled with each other even after the appearance of symptoms in the others, the probability amounted to almost a certainty that this little girl would not escape infection. The following effort at immunization was therefore made: ½ c.c. of Schering's antitoxine was injected on October 28th, her temperature at that time being 99°. On October 30th a second injection of 0.8 c.c. of Behring's antitoxine was made. Subsequently the congestion in the throat cleared up and the child remained well. Dr. Ravenel examined a culture from her throat on November 6th and found Klebs-Loeffler bacilli. It is important to add that the mother of these children, who has constantly been in attendance upon them, is at present writing suffering from the same disease.

I have ventured to report these few cases for the consideration of my colleagues, being well aware that their number is too small to permit of any definite conclusion as to the value of serum-therapy of diphtheria, all the cases, moreover, having been treated, in addition to the serum-therapy, according to the generally accepted rules of practice. Nevertheless, the cases here presented showed some features so striking that they appeared to be of interest. After each injection a rapid fall of temperature was noted, as you will see by the charts. This reduction, however, only lasted twenty-four hours, but when it would rise again, it was never to its original degree. In Case I, where two injections were made, the same phenomena were observed after each.

At the same time a marked amelioration in the difficulty of breathing was noted. The heart was much less favorably influenced, being often irregular and weak. Nevertheless, I feel that if a sufficient quantity of serum had been at my disposal, and repeated injections could have been made, the toxine still remaining in the circulation might have been more effectually neutralized and its depressing effects on the heart avoided. The behavior of the membranes was peculiar, inasmuch as they did not seem to thrive; they failed to spread, and in from twenty-four to forty-eight hours after the injection they assumed a fatty pultaceous appearance, and in each instance disappeared within a week. The cases as a whole ran a milder course. I do not think that the cases could be called mild ones, since the two children who had not been treated by antitoxine serum died. The continued presence of probably virulent Klebs-Loeffler bacilli in the throats of two of the other children would, I think, indicate that antitoxine serum does not kill the microorganisms themselves, but merely neutralizes their poisonous products, and that consequently isolation and poper disinfection of the throat is indicated as heretofore.

In conclusion, I desire to say that I feel very much indebted to Dr. Ravenel for his painstaking bacteriological examinations of my cases. I also desire to thank my friends, Drs. A. Klein and P. A. Trau, for their kind assistance in watching and keeping records of the cases.

My thanks are also due to Messrs. T. C. Laubach and L. B. Phillips, druggists of this city, who procured the serum for me, the latter gentleman being the first, I believe, who secured Behring's antitoxine in this city.

A GERMAN VIEW OF "AMERICANISM" IN MODERN MEDICINE.

A remarkable article has recently appeared in the *Deutsche Medicinische Zeitung*. The author's personality is modestly concealed under the pseudonym "B. L. in W." His doleful lucubrations have been widely copied by the medical press of the fatherland. The gist of B. L.'s terrible arraignment of modern medicine is that European, even including German, therapy is becoming rapdily "Americanized." How best to meet this depraved tendency in a downward direction is made the subject of his anxious inquiries.

The Teuton naturally stands aghast at the dismal vista opening before his dreamy eyes by the rapid strides of German medicine away from time-honored theorizing and scientific hair-splitting into the broad domain of common sense and the practical. That is what it means for German medicine to become Americanized.

If B. L.'s representations can be relied upon, there must be great alarm in the inner circles of German medical autocracy, where abstract science is still supposed to reign supreme, while German death-rates go on healthfully increasing.

We are told that "the American healing art has, without doubt, made extraordinary advances in the past few decades." It is indeed nothing short of disgraceful that the German public is beginning to ask the German doctors to cure German ailments on the American plan.

The involuntary confessions of B. L. disclose a peculiar state of affairs. For while America still sends its annual quota of callow youths to the empire of William II in quest of "higher medical education," the subjects of his majesty are clamoring for transatlantic notions in the conduct of medical practice. Now the *Record* has always believed in reciprocity. For this reason we will welcome to our shores all those German graduates who, after having been drilled in approved Teutonic methods of pure science, find themselves a trifle deficient in those minor qualifications of professional power which help to cure the patient. At the same time we are willing to send some of our own medical citizens across the water, in order to find out the best-sounding Greek names for diseases which they have long known how to handle, though not, perhaps, to euphoniously designate. A fair exchange on such lines ought to be helpful all around.—*N. Y. Med. Rec.*

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SATURDAY, DECEMBER 1, 1894.

EDITORIAL.

THE PARASITES OF VARIOLA AND VACCINIA.

At the Eleventh International Medical Congress there was an interesting discussion on the etiology of variola.

Guarnieri gave the results of his investigations of the forming pustules in variola, in which he found a microörganism to which he gave the name *Cytoryctes vaccinia*, and he devoted his paper largely to the morphology of the organism which he believes to be the cause of variola. This organism was observed in a hanging-drop preparation to have amœboid movement. It was observed to move in a fresh preparation from the contents of a beginning pustule when examined on a warm stage. It was also observed to divide. When properly stained with methyline blue mixed with blood-serum the *cytoryctes* show a rounded mass or body within the organism which stains very slightly, surrounded by a clear space.

At the same meeting Monti gave the results of his investigations into the etiology of variola. He has studied bacteriologically the contents of a large number of vesicles and pustules from about ten cases of small-pox, and with great constancy found in the pus *Staphylococcus pyogenes aureus* and a microphyte of the normal epithelium. He also examined in a similar manner cases of *purpura variola* where the patients died in the early stages of the disease. In these cases the cultures remained clear or developed very few colonies of known epidermal bacteria. Anaërobic cultures gave negative results.

A microscopical examination, however, of the hemorrhagic cases discovered in the epithelial cells of the Malpighian layer nests of hemorrhagic points containing characteristic bodies which stained readily, after the method of Biondi, with hæmatoxylin and with a special mixture of hæmatoxylin and safranin. These bodies were sometimes very small; sometimes from two to three micromillimeters in diameter. They varied somewhat in form, occasionally resembling the figure 8. Ordinarily each epithelial cell contains a single organism in a mass of protoplasm. The nuclei of the epithelial cells were more or less obscured by the organisms. Control examinations of other diseases gave negative results.

The constancy with which Monti found these bodies in five cases of hemorrhagic vesicles and in the prepustular stage, led to certain investigations with this substance on the cornea of rabbits. He noted that after inoculating the eye with the infected substance he found the same bodies in the surrounding cells, but with similar inoculations with other substances the wound healed perfectly in a few days.

These results led him to the conclusion that the organism described was the cause of variola or small-pox. Monti did not think that these organisms belonged to the same class of protozoa entertained by Guarnieri, but to a much simpler class of organisms, the *Lobosi*.

Since the introduction of bacteriological methods a host of observations and experiments have been made to determine the etiology of vaccinia. A few more recent observations are of interest, yet the results are still quite contradictory.

Klein (Supplement to the Local Government Report containing the report of the Medical Officer for 1892–93, London, 1894) gives the results of several investigations of calf lymph. The results are similar to many other bacteriological investigations, inasmuch as a great variety of bacilli, *streptococci*, *staphylococci*, etc., were found.

He differs, however, in finding a bacillus which appears to be characteristic of the lymph. So numerous were these bacilli that in cover-glass preparations made from the lymph they would easily be mistaken for preparations of pure cultures. They are frequently (always in seventy-two-hour lymph) in clumps. The majority of the groups included from three to eight bacilli. They contain globules which Klein believes to correspond to spores.

He was, however, unable to cultivate this bacillus on artificial media or in the subcutaneous tissue of a calf.

ABSTRACTS.

MINISTERIAL INDORSEMENTS OF HUMBUGS.

We are sorry to see the names of Christian ministers and persons occupying important positions in the Church circulating through the country indorsing barefaced frauds which are poorly executed, and no better than Indian charms. Whenever a minister of the Gospel allows his name to be attached to anything whose advertisements make statements impossible of fulfillment, or contrary to established principles of science, and especially to be mixed up with all sorts of testimonials written obviously by the most ignorant and uncultivated persons, he loses the respect, and justly, of that class of the community which in the long run fixes the estimate in which he is held.

This, together with similar exhibitions of weakness, often accounts for the failure of young men who otherwise give bright promise of success, and the early retirement of those who in spite of them had attained a good standing.

In the interest solely of our readers we advise them to pay no attention to a ministerial testimonial to remedies whose composition is a secret, or which promise positively to cure otherwise incurable or generally fatal diseases. And all the more so if the testimonial contains references to the Almighty and providential direction to buy the medicine. You may be sure then that whatever other effect the remedy has had, it has either weakened or has not improved the condition of the nerve cells upon which sound judgment depends.

When ministers go further and surrender their photographs to patent medicine venders to be used in advertisements and on bottles, they render themselves liable to one of two suspicions: Either that they have an inordinate desire to appear before the public, in which case such extravagant vanity must weaken their influence; or that they have received

a compensation for the privilege. For, that quacks of all sorts are ready to pay largely for certificates from physicians, for editorial notices, and for the privilege of publishing letters from and photographs of clergymen, cannot be doubted.

Not only do they thus render themselves liable to suspicion, but they grieve every truly refined member of their congregations, and every member, in fact, of their denomination who sees their pictures and letters displayed for such purposes. Could many of the ministers know what is said of them, self-interest would lead them to refuse in every case. It should be taken as an insult by every minister of the Gospel of Christ to be asked to furnish his photograph, or to consent to its use, as a part of a patent medicine or any other advertisement.

In one instance the name of such a person was proposed for the pastor of one of the best churches in Methodism. A brother of high character and respectability, noted for his kindness when speaking of ministers, rose and said: "I hope that this brother will not become our pastor." "Why?" said half a dozen voices. He did not reply, but spread before them a newspaper containing the photograph of the minister, in connection with three or four letters, one from himself interlarded with ascriptions of praise to the Deity for having led him to buy the —— pills. His name was not mentioned again.—*Christian Advocate.*

THE DIAGNOSIS OF TUBERCULAR JOINT DISEASE.

A. G. Miller, F.R.C.S.E., Surgeon to the Edinburgh Royal Infirmary, writes (*Edinburgh Med. Jour.*, November, 1894): In my experience as a hospital surgeon I have not infrequently seen mistakes made in the diagnosis of tubercular joint disease. From the statistics of the hospital reports, I gather that the proportion of tubercular to all other joint affections is from three-fourths to four-fifths. In this calculation I no not include spinal or sacro-iliac cases —only the joints of the extremities.

I have drawn almost entirely from my own experience. Consequently my views may not coincide with those of other surgeons. I give them, however, to the profession for what they are worth, hoping that they may be of use to some.

The affections that in my experience are liable to be confounded with chronic tubercular joint disease are the hæmophilic joint; the hysterical joint; sarcoma; chronic traumatic synovitis; syphilitic synovitis; chronic rheumatoid arthritis; tubercular epiphysitis; tubercular bursitis; and tubercular teno synovitis. Before dealing with the differential diagnosis of chronic joint tuberculosis from these various affections, I would first point out what I believe to be the leading and most reliable characteristics of chronic tuberculosis of the joints of the extremities. These are mainly six:

1. Mode of onset—history of slight injury or none.
2. Appearance of joint—pale, ovoid, smooth, etc.
3. Temperature of joint slightly raised.
4. Absence of pain, except on movement.
5. Limitation of movement by muscular spasm.
6. Atrophy of muscles, especially of the extensors.

1. The mode of onset. The patients who mostly come to us with tubercular joints (children and adolescents) are very liable to have injuries, and they are so accustomed to these that they think nothing of them, but immediately forget them. Older patients are very apt to remember, or at any rate to classify, their diseases by the treatment to which they have been subjected on their account. An injury, consequently, that has received no treatment is generally forgotten. There may be no history, therefore, of an injury, and the onset is said to have been insidious.

On the other hand, we often get a history of a slight injury which caused a slight amount of swelling, hardly sufficient to oblige the patient to remain in bed—or perhaps only for a short time. The patient goes about, limps a little, or is stiff and constrained in some movements (if the upper extremity is affected), and perhaps cries if roughly handled. The joint never gets well. The swelling comes and goes, but never quite disappears. Movement becomes more restricted and painful.

Up to this point inflammation is not feared by the parents, because the joint is not apparently inflamed. Sometimes, however, a bonesetter is consulted, on the supposition that the "joint is out." He wrenches the limb and makes things much worse, and then orthodox advice is sought. Every hospital surgeon knows that this is a very common history which I have been trying to sketch.

I believe, therefore, that all these cases originate in a slight injury (I never saw one which originated in a severe one), which is not treated and forgotten, or is treated in such a way as not to bring about a perfect recovery; that is to say, the joint is never properly rested.

2. Appearance of joint. The pale and rounded or ovoid appearance of the joint is, of course, well known, having originated the ancient title of "tumor albus." The skin looks wonderfully natural. There is, however, a smoothness, due to the obliteration of the normal folds and furrows, which is peculiar. There may be some unusually distinct superficial veins and a number of long silky hairs—if the patient be old enough.

The normal prominences of bone, which give the distinctive external features to each joint, are smoothed down or obliterated by the swelling which gives the characteristic rounded or ovoid appearance to the tubercular joint. This condition is sometimes made out properly only on careful comparison of the affected joint with the normal one. The smooth rounded appearance is explained by the slow increase and œdematous character of the swelling. That is to say, the swelling is an œdema, and as it occurs very slowly, it has time to find accommodation in the hollows and convenient slack places in and around the joint, where there are no restraining attachments of ligaments and tendons.

3. Temperature of joint. This is usually slightly, but distinctly, raised as compared with the corresponding healthy joint. This rise of temperature is always present and denotes the existence of an inflammatory process in the joint. Now, it must be remembered that this inflammatory process is not a slight one, though external appearances and subjective symptoms may tempt us to suppose so. I have learned and I teach that the amount of disease present is always in excess of the apparent symptoms. When one cuts into a tubercular joint, one is often surprised to find the amount of disease and destruction that is revealed.

The general temperature of the patient may be raised also, but sometimes it is normal or even subnormal. If raised, it follows a somewhat irregular course, and the highest point is not registered in the evening, as in other inflammatory affections, but often in the afternoon.

4 and 5. The fourth and fifth symptoms I will take together, because they are mutually dependent and explanatory. These two conditions are absence of pain except on movement, and limitation of movement. I might perhaps divide this very characteristic condition of strumous joints into three: 1, apparent absence of pain; 2, pain on attempts at passive movement; and 3, limitation of movement on the part of the patient. This double or triple (as you take it) condition of a joint I consider very characteristic of strumous disease.

We all know how patients can walk into hospital (limping perhaps more or less) with a hip, or knee, or ankle joint which is distinctly diseased, and perhaps has been so for some months. Again, a child may come to us who holds an arm in a rigid manner, who nurses it carefully, and who is very suspicious of its being handled; and yet the parents will say that it does not complain of it except when it is touched.

We know how surprised students often are when they are told that such joints are tubercular and require to be excised; and how still more surprised and terrified the parents are when told that an operation is necessary.

The absence of pain is what deceives. And it is ignorance that a joint may be far gone with strumous disease and yet apparently painless (except on movement) that leads to the destruction of so many joints; for the early stage of the disease is overlooked or not diagnosed, and the only period during which perfect recovery can be obtained, by proper treatment, is lost. Pain on movement is not a symptom peculiar to strumous joints, but absence of pain except on movement, associated with more or less fixation of the joint, is, I think, peculiarly characteristic of tubercular disease.

The absence of pain is due to fixation of the joint and to the slight degree of in-

flammation present. The latter is subacute and chronic. At the same time, though slight in degree it is extensive, as I have already said, because it usually involves, sooner or later, all the tissues constituting the joint—bone, cartilage, periosteum, synovial membrane, ligaments. The condition is arthritis—that is to say, an affection of the joint as a whole, and not a synovitis merely, as it is sometimes designated. This latter peculiarity of strumous disease explains the characteristic pain on movement, for with movement one (or more) of these structures is hurt and pain results. They cannot all escape. Indeed, they are all more or less hurt by movement. The absence of pain, therefore, is only apparent, being due to the involuntary fixation of the joint by the patient, to prevent the pain that would be caused by movement. The apparent absence of pain and the fixation of the joint have the same explanation, and that is why I have bracketed them together.

That the rigidity of the joint is due to muscular spasm is easily demonstrated in the early stages of the disease (before destruction of tissue and adhesions have taken place) by placing the patient under chloroform, when free movement of the joint is at once obtained.

The explanation of this muscular contraction or spasm is well known—it is reflex. By an impulse sent from the diseased joint to the spinal cord, and a reflected impulse sent to the muscles acting on the affected joint, the latter is fixed or splinted and painful motion prevented. In this way nature tries to bring about recovery, and has suggested to surgeons the method of treatment that has hitherto been most successful, viz., immobilization.

The affected joints (hip, knee, elbow) are generally not only fixed, but bent. This is explained by the well-known fact that the flexors are more powerful than the extensors; and the joint is usually more comfortable when bent than when straight, probably from the same cause. This rigidity or fixation is not confined to tubercular joints. We see an example of it in hallux rigidus. There the great toe is splinted on account of the existence of an arthritis. We see the same rigidity in the spine in early caries.

6. The last symptom which I would refer to as specially characteristic of tubercular joint disease is atrophy. This atrophy has many points worthy of consideration:

1. It affects the whole limb more or less.

2. It is greater and more rapid than can be explained by mere want of use.

3. It is more marked than in any other joint affection.

4. It specially affects certain muscles and groups of muscles; each joint having its peculiarities, which are very constant.

1. In strumous joint disease the whole limb atrophies. This is well known and I need not dwell on it. Witness the shrunken and wasted limbs in hip, knee, shoulder or elbow disease. There are two points, however, to which I would like to draw attention. The atrophy is not limited to the muscles, but affects the limb as a whole, and in the second place, this atrophy of the limb is apt to persist even after recovery of the diseased joint. Of this there are many examples, which must readily occur to the minds of all surgeons. I repeat, the atrophy is of the limb as a whole, muscle and bone alike, and it tends to persist. What is the explanation? I believe that the cause is a reflex contraction of the arteries of the limb which interferes with nutrition. I have been led to that opinion by observing, when I have had occasion to amputate for tubercular joint disease, that though there may be many active vessels in the neighborhood of the disease, the main arteries are always very small. I have often observed the latter about half the size one would expect them to be under ordinary circumstances—in a primary amputation, for instance.

2. The atrophy is greater and more rapid than would be caused by mere want of use. This, I think, is now generally admitted and recognized. There are several facts which go to prove this. We have seen, for instance, that when cases present themselves for treatment the limb is still being used to a certain extent; yet there is in such cases always well-marked atrophy.

3. The atrophy in strumous disease is more marked and rapid than in any other joint affections. This statement I cannot prove by statistics; I speak merely from experience. I thoroughly believe this, and more than once a rapid and extreme atrophy has made me suspect tubercle, the diagnosis being subsequently confirmed.

Muscular and general atrophy is usual in joint affections; but, I repeat, it is most marked in strumous disease.

4. The atrophy specially affects certain muscles and groups of muscles. These are, stated generally, as follows: Hip, glutei; knee, quadriceps extensor; ankle, extensors; shoulder, scapular muscles; elbow, triceps and biceps; wrist, muscles arising from internal condyle of humerus.

I take these* merely as examples. The flattening of the hip and loss of the natal fold on the thigh are well-known signs of hip disease. The wasting of the quadriceps extensor in disease of the knee joint is also familiar. When one examines the thigh in such a case, it is wonderful how little seems to lie between the skin and the femur on the front of the thigh. Then in disease of the shoulder the prominence of the spine of the scapula from the wasting of the supra and infra spinati muscles is very evident, as also the prominence of the acromion from wasting of the deltoid.

Pathological Note. — The usually accepted explanation of atrophy is that it is due to a reflex action through the trophic centers in the anterior horns of the spinal cord. But why does the atrophy affect certain muscles earlier and more than others? Hilton* has pointed out that the same nerves which supply any joint supply also the muscles acting on that joint. In this way he explains the unconscious fixation of a diseased joint which always occurs and to which I have already referred. In the same manner he explains the flexion that usually takes place (knee and elbow) by the greater power of the flexors over the extensors. But he does not explain the atrophy. Ferrier† does this by telling us that extensor muscles are always earlier and more quickly atrophied than the flexors, because they are the weaker. "The vitality of the extensor centers and nerves is the first to become exhausted by any condition tending to lower the vitality of the nerve centers and nerves in general."

Charcot‡ has shown that muscular atrophy from disease of a joint is not the same as that from want of use—the latter being a fatty degeneration, which the former is not. He was of opinion that nerve irritation alone is capable of determining rapid and early atrophy of muscles, and that the diseased-joint irritation does so markedly, because its irritation is continuous. He points out also that atrophy started by joint disease is apt to persist and to cause general atrophy of the limb (to which I have already referred). In the *British Medical Journal** there are references to investigations made by German and French observers, who found a simple degeneration in the atrophied muscles connected with joint disease. The muscles "were obviously atrophied and of a paler color than those on the other side, and they had lost their firmness and elasticity." The microscope showed "no trace of degeneration," but the "fibers were considerably smaller than they should be." This, it appears to me, points to what I have already suggested in my paper on Bier's method of treating tubercular joints by congestion, viz., that the reflex action, acting through the trophic centers in the anterior horns of the cord, causes a contraction of the arteries. It seems natural to suppose that diminution in the size and power of a muscle should be due to a diminished blood supply; and if the object, so to speak, of a reflex action is to cause atrophy of a muscle, surely the quickest and surest way would be to shut off the blood supply. Then one must remember that though the atrophy begins in certain muscles, it ultimately extends to the whole limb and tends to persist.†

Muscular atrophy cannot be due to muscular spasm in the cases we are considering, because the muscles affected with spasm are not those most atrophied—*e.g.*, in the case of the knee the hamstrings are most contracted and the quadriceps is most atrophied. Again, this theory will not explain the atrophy of a whole limb—muscles, bone and all.

Another explanation has been offered of the muscular atrophy in tubercular joint disease: for instance, of the deltoid in shoulder and the quadriceps extensor in knee affections, viz., that the tubercle bacilli enter the muscular substance from the subjacent joint and cause a low form of inflammatory process which produces

*"Rest and Pain," second edition, p. 150

†*Lancet*, August 12, 1893, p. 386.

‡"Diseases of Nervous System."

*Epitome, January 24 and July 11, 1891.

†In Holmes' "System of Surgery," vol. ii, p. 209, several instances are given of muscular atrophy resulting from contraction of blood-vessels from reflex causes and neuralgia; and an instance is given of atrophy of the muscles of the thumb and hand due to an injury to the ulnar artery.

the atrophy. No proof of this has, however, been adduced; indeed, as we have already seen, the atrophy has been proved to be a simple one, unconnected with any degenerative or other change in the substance of the muscles themselves.

At the same time, one must admit that it is very likely that the muscular substance is tubercular in some way, for it has been demonstrated that muscle from tubercular animals, although it may seem perfectly sound and good, is capable of infecting guinea-pigs with tuberculosis.

In what way is the apparently healthy muscle infective? Does it contain spores? Are bacilli derived from the blood and lymph vessels? How do the lower animals get their tuberculosis? Why has muscle tubercle not been observed in man? These are questions that suggest themselves, but cannot, of course, be discussed in this paper.

The Strumous Joint.	*The Hæmophilic Joint.*
1. Slight injury or none.	1. Injury, often slight.
2. Joint pale, ovoid, slightly warm, boggy (seldom fluctuating; patella fixed in knee case), and synovial membrane thickened (œdematous).	2. Joint pale or slightly discolored, rounded in outline (shape that of simple synovitis), warm, boggy or fluctuating (in case of knee patella, movable).
3. Limb fixed, movement painful and resisted by muscles.	3. No fixation or pain on movement if performed gently.
4. Marked muscular atrophy, especially of extensors.	4. Muscular atrophy not a sympt m.
5. Presence of tubercular affections elsewhere.	5. Marks of ecchymosis.
6. History of tubercle in family.	6. History of hæmophilia among males of family, transmitted through females. History of former bleedings from cuts; epistaxis, etc.
7. Patient delicate-looking.	7. Patient delicate-looking.
8. Rest will not bring about a cure in a week or two.	8. Rest will cure in a week or two.

I now take up the subject of differential diagnosis, and this will have been made more easy by the fullness with which I have gone into the diagnostic points of tubercular disease.

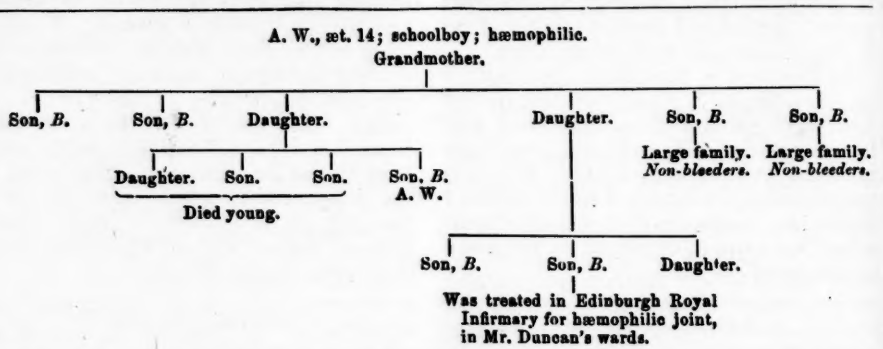
I. The first affection I take is the hæmophilic joint. The hæmophilic joint is very like the tubercular. There is usually a history of a slight injury. The joint is pale, rounded in outline and not painful. Flexion, however, may cause pain. There may be some muscular atrophy. The child is delicate-looking and may have a suspicious family history, some relatives having died of tubercular disease. The diagnostic points on which I would rely are: 1. Movement of the joint is fairly good and is not resisted by muscular reflex, because it is not painful if done gently. 2. Muscular atrophy, if present, is not marked and does not affect special muscles as in tubercle. 3. Marks of ecchymosis may be present, both recent and ancient. It is quite legitimate in a doubtful case to pinch the child and look next day for an exaggerated ecchymosis, which is sure to occur in a hæmophilic case. 4. The history of previous epistaxis, or bleeding from cuts, is a valuable help. 5. If the joint, or some other, has been affected previously, it will have recovered with perfect restoration of function—a state of matters that does not occur, in my experience, in tubercular disease. 6. Then there is the family history. Bleeders appearing among the males, but transmitted through the females of the family. 7. Lastly, time will show. In a few days there may be discoloration over the joint from the soaking through of the blood in the joint, and in a few weeks the joint will get perfectly well if it is rested. This, of course, will not occur in a tubercular joint (more the pity).

In this connection I would like to record the case of a boy who has been frequently under my care for hæmophilia.

A. W. came under my care first when about four years of age. He had an enlarged knee joint, which was diagnosed as white swelling, partly from its appearance and partly from the history of his father having died of phthisis. The joint was treated by rest and improved somewhat. As there was great restlessness on the part of the patient and some suspicion of starting of the limb, the actual cautery was applied. This at once demonstrated the true nature of the case, because when the sloughs separated bleeding commenced and nearly proved fatal. The joint recovered perfectly. Since then the boy (who is now fourteen years of age) has frequently been under my care for epistaxis, cut fingers and effusion into a knee or an elbow joint. When last seen he was perfectly well, not a trace being left

of any of his joint affections. His family chart, which is very typical, is appended.

II. The hysterical joint is sometimes very difficult to diagnose from strumous disease. I have treated several cases in which the hip and knee were affected. Two cases of hysterical hip occurred in ladies, two in boys. The two former got well under massage, counter-irritation and change of air. The two latter were cured



at once by circumcision. Two knee cases were females, one of whom has been under treatment for several years.

In regard to the question of diagnosis, the points I would depend upon are: 1. Numerous and changing painful spots. 2. Want of definiteness and accuracy in symptoms. There is a difficulty in making out what the condition really is, and there is not a true ring in the symptoms. 3. The patient has the peculiar "shifty"

of advanced tubercular disease of the knee that resembled sarcoma in external appearance. I could imagine the same sort of thing in connection with the shoulder and other joints. The resemblance is in appearance—that is to say, it is external and superficial. Both conditions present a swelling in the neighborhood of the joint, smooth, rounded or ovoid in outline, with engorged superficial veins coursing over it; warm to the touch; soft, elastic, perhaps fluctuating; often especially soft at one point as if pointing. The patient is probably young and delicate looking, gives a history of an injury followed by a swelling, which enlarged slowly at first and then more rapidly. There is muscular atrophy of the limb. The resemblance to white swelling is considerable, but on closer investigation we find in the case of a sarcoma that the swelling began on one

The Tubercular Joint.	*The Hysterical Joint.*
1. Joint pale, ovoid, hot, boggy; large veins, hairs, etc.	1. Joint enlarged; nothing definite to be made out.
2. Joint fixed; movement painful.	2. Joint fixed; movement resisted.
3. Pain not a special symptom.	3. Hyperæsthesia; pain at varying points.
4. Marked muscular atrophy, especially of extensors.	4. Limb may be smaller, but there will be subcutaneous fat.
5. History of tubercle, and perhaps presence of tubercle elsewhere.	5. History of nervous complaints. Evidence of hysteria; ovaries sensitive, etc.
6. Disease progressive, or else improving under treatment:	6. Disease stationary and no improvement from local remedies.
7. Under chloroform distinct evidence of disease.	7. Under chloroform all symptoms disappear.

look of hysteria, which I cannot describe, but which is generally easily recognized once attention is directed to it. The ovaries may be tender, etc. 4. All symptoms disappear under an anesthetic and reappear on the patient recovering consciousness.

III. Sarcoma of the lower end of the femur I have seen mistaken for tubercular knee joint, and I have seen several cases

side (where the injury probably had been) and was small at first and localized. At this time the patient is perfectly healthy. But he begins to show evidences of delicacy and wasting after the swelling has existed for a month or so and after it has begun to grow more rapidly and to cause pain. We find also that the swelling takes only a month or two instead of several months to grow. Then on examining

the part locally we find that the joint is really not involved. Movement is possible (within certain limits) if carefully performed, there being no true splinting of the joint. The swelling is somewhat to one side, and the patella, though lifted up, is usually on one side. There may be pulsation. Atrophy, sometimes considerable, is more general than in tuberculosis.

It will be seen that I refer to advanced cases—*i.e.*, of several months' duration.

White Swelling.	*Sarcoma.*
1. History of slight injury.	1. History of injury.
2. Joint pale, ovoid, warm, boggy; enlarged veins, hairs (if suppuration, fluctuation, pointing).	2. Swelling near joint; smooth, rounded, warm, elastic, large veins; may fluctuate at parts.
3. Limb fixed; movement painful.	3. Healthy joint can be made out.
4. Marked muscular atrophy, especially of extensors.	4. Muscular atrophy general.
5. Tubercular history and tubercle elsewhere.	5. No tubercular history; patient healthy till tumor began to grow.
6. Comparatively slow growth.	6. Comparatively rapid growth.
7. Slight rise of temperature, which is irregular.	7. If rise of temperature, it is steady.
	8. Growth commences at one side; may pulsate.

It is only in such that I have seen difficulty in diagnosis. In early cases there ought to be no difficulty.

IV. Chronic traumatic synovitis may be diagnosed from white swelling by—

1. The history. Injury usually pretty severe. Sharp, acute synovitis not completely cured. Family history good.

2. Movement fairly free and not painful, unless there are adhesions.

3. If adhesions, then flexion is painful only when adhesions are put on stretch. In other words, movement is free and painless up to a certain point.

4. No marked muscular wasting. If present, is general and not special. To put the thing in a nutshell, this is a synovitis. The tubercular affection is an arthritis.

5. Swelling shape of synovial membrane, with fluctuation (floating patella in case of knee). Thickened synovial membrane may be felt at margin sometimes.

In this connection I would like to say a few words on two points: 1, adhesions; 2, thickened synovial membrane.

1. Adhesions. The diagnosis of these adhesions is usually easy, and they, if present, aid the general diagnosis very much. The diagnostic point is freedom of movement and painless movement *up to a certain point.* Then come both pain and fixation of the limb by the patient. This is seen best in the knee and is very characteristic. The knee may be used fairly well in walking, but if an attempt be made to fully flex the joint, acute pain is produced when a certain angle is reached and the patient at once resists. Sometimes the patient, anticipating the painful stage, resists the flexion before the adhesion-point is reached. This is very different, however, from the general spasm and fixation of the limb, or splinting by muscular contraction, that occurs in tubercular arthritis.

2. Thickened synovial membrane. This is most easily made out by pressing on the margin of the synovial membrane. In the knee, for instance, at the upper edge of the pouch above the patella. This thickening differs from the œdema of tubercular disease by being firmer, denser and more defined. This can be easily understood when we consider that the one is a genuine hypertrophy of the synovial membrane, the other an inflammatory œdema.

Strumous Arthritis.	*Chronic Traumatic Synovitis.*
1. Slight injury or none.	1. Pretty severe injury.
2. Joint pale, ovoid in outline, slightly warm, boggy; synovial membrane œdematous.	2. Joint pale, swelling shape of synovial membrane, fluctuation, synovial membrane thickened.
3. Limb fixed by muscular spasm.	3. Joint movable, unless adhesions, when movement arrested abruptly at certain point.
4. Marked muscular atrophy, especially of extensors.	4. Muscular atrophy slight and general, not special.
5. Tubercular history and tubercle elsewhere.	5. No tubercular history or manifestation.
6. Slight rise of temperature, of irregular type.	6. Temperature normal.

V. I shall next consider syphilitic synovitis, which I have met with almost solely in the knee joint. This should not be difficult to diagnose from tubercular disease, though it is sometimes difficult to differentiate from simple chronic synovitis and chronic rheumatoid arthritis. The main point of distinction is the history of the case. Previous history of syphilis, no

traumatism; not infrequently bilateral; not giving way to ordinary treatment, but improving under mercury locally and potassium iodide internally.

VI. Chronic rheumatoid arthritis may be mistaken for tuberculosis. I think that they are not infrequently confounded, and I have seen cases in which only animal inoculation could possibly have decided the matter. In advanced cases of both diseases you have involvement and ultimate destruction of all the tissues forming the joint. The synovial membrane is thickened, the cartilage is destroyed, the bone is inflamed, and the ligaments are softened and stretched, permitting lateral movement accompanied with grating. You may have suppuration in either case

In early cases of chronic rheumatoid arthritis I would rely for diagnosis on—(1) the condition of the bone; (2) the presence of fluid; (3) the affection of other joints; (4) condition (pain especially) affected by changes in the weather.

In advanced cases, in which somewhat acute symptoms have supervened and in which there is softening of the bones (carpus), still more if suppuration have occurred, diagnosis from tubercle is more difficult. But this is of less importance, because the treatment is the same, viz., excision of the joint or amputation. These latter cases may be, I am quite prepared to admit, genuine tuberculosis ingrafted on chronic rheumatoid arthritis; but, as I have already said, animal inoculation could best decide that.

VII. The last condition that I shall contrast with tubercular arthritis is tuberculosis occurring near but not in a joint. Under this head are tubercular epiphysitis and tubercular bursitis. The former may involve the joint early and thus become an arthritis or may give rise to an epiphyseal abscess. The diagnosis ought to be easy, and in my experience there is usually no difficulty.

The point most to be relied on is the fixed pain in the epiphysis, increased by pressure, but not by gentle movement, and generally worse at night. In short, the localizing of the disease in the epiphysis, and not in the joint, settles the diagnosis.

In regard to tubercular bursitis he diagnosis is sometimes not so easy. The

Strumous Arthritis.	*Syphilitic Synovitis.*
1. Slight injury.	1. Came on slowly.
2. Joint ovoid and boggy.	2. Joint shape of synovial membrane; fluctuating.
3. Rigid and painful on movement.	3. Painless, movable, but weak.
4. Atrophy marked and special.	4. Atrophy slight and general.
5. May be multiple, but not symmetrical.	5. Sometimes symmetrical.
6. History of tubercle.	6. History of syphilis.
7. Tubercle elsewhere.	7. Traces of syphilis elsewhere.
8. Not materially benefited by mercury and K. I.	8. Benefited by mercury and K. I.
9. Increase of temperature.	9. No increase of temperature.

Tubercular Arthritis.	*Chronic Rheumatoid Arthritis.*
1. Patient usually young.	1. Patient usually advanced in life.
2. Tubercular history.	2. History of rheumatism or gout, or both.
3. Tubercle elsewhere.	3. Chronic rheumatoid arthritis elsewhere.
4. Joint ovoid and boggy.	4. Ends of bones enlarged; synovial membrane thickened and containing fluid.
5. Joint fixed; pain on movement.	5. Pain on movement, perhaps grating; joint not fixed.
6. Muscular atrophy, especially of extensors.	6. Muscular atrophy general.
7. Not affected by weather.	7. Affected by weather.
8. Slight rise of temperature, which is irregular.	8. No rise of temperature generally; rather subnormal.

Tubercular Arthritis.	*Chronic Tubercular Epiphysitis.*
1. Joint enlarged, ovoid, boggy, etc.	1. Joint free; swelling above or below joint.
2. Pain not a prominent symptom, only on movement.	2. Pain on pressure on epiphysis; worse at night.
3. Joint fixed, etc.	3. Joint not fixed usually.
4. Atrophy of muscles, etc.	4. Atrophy not so marked and not "special."
5. No special œdema of limb.	5. Limb œdematous below diseased part; slight collection of fluid in joint (symptomatic).
6. Slight rise of temperature, which is irregular.	6. Rise of temperature more marked.

bursæ that I have seen most affected are —(1) that over the trochanter major; (2) under the tendon of the psoas and iliacus; (3) over the patella; (4) under the ligamentum patellæ; (5) under the deltoid. The first two may be confounded with hip-joint disease. The treatment, however, is practically the same, so an error does not much matter.

I have found these bursal affections usually connected with disease of the underlying bone. Whether the disease commences in the bone or the bursa, I do not know; but I would be inclined to suspect the bone. I always treat these cases as if they were joint disease. The general diagnosis depends, as in the former instance, in localizing the disease. If the joint be healthy the disease must be elsewhere. Pain, swelling, etc., will then localize the diseased condition.

There is another affection to which I might refer here, viz., tubercular tenosynovitis; but the differential diagnosis of this from tubercular arthritis should not be difficult in any ordinary case.

In conclusion, I wish to say that I do not submit the above descriptions and remarks as exhaustive of the subject. They are intended, being the outcome of my experience as a hospital surgeon during the last twelve years, to be an aid to others who may not have had as much experience in tubercular joint disease.

SOCIETY REPORTS.

THE COLLEGE OF PHYSICIANS OF PHILADELPHIA.

SECTION ON GENERAL SURGERY.

Meeting of November 9, 1894.

William J. Taylor, M.D., presented a paper on

WOOD-PULP SPLINTS AND SPLINT MAKING MATERIAL, AS SUGGESTED BY DR. E. A. TRACY, OF BOSTON.

I have here a number of splints made from a new material, the invention of Dr. Edward A. Tracy, of Boston, and which he was kind enough to send me, along with some of the sheets of the material itself. You have probably all seen the article by Dr. Tracy in the *Medical News* of March 17, 1894, entitled "A Brief Splint-Technology for Surgeons." When I read the article I was so much impressed with the probable value of the material for splint-making that I wrote to him, and it is in answer to this letter that he sends me these samples.

All of these splints were made by him and have been in actual use at the Boston City Hospital. He writes me that "the results to be gotten will repay the trouble of acquiring the proper technique—and this trouble is but slight."

The material is best described by Dr. Tracy's article, just referred to, and of which the following is an abstract: "The basis of the material is wood-pulp, made preferably from the crushed fiber of the poplar tree, and rolled in such fashion that the broken fibers intertwine in every direction and loosely, so that an increase of plasticity is thus given the product. These sheets are further strengthened by having a fabric introduced between the layers of the pulp, or by interweaving with the short, crushed wood-fiber, a long jute or other tough fiber.

"The sheets are rolled of different thicknesses, and are numbered one, two and three, according to their thickness in millimeters.

"The chief characteristics of this material are stiffness or rigidity when dry and plasticity when moist. Its rigidity can be increased *ad libitum* by the use of a silicate solution as a moistener. Its plasticity has a limit, but this is rarely reached except when molding the material over certain complex curved surfaces. Besides the foregoing characteristics, the material possesses that desideratum of a splint material—extreme light-

ness. Its cheapness also deserves passing mention.

"Water or a stiffening solution can be used to moisten the material. If water is used the splint must be protected from the perspiration, lest it soften, by a covering of oiled silk or paper, or best by shellac. A stiffening solution with several qualities to recommend it is that of silicate of potassium; silicate of soda is almost as serviceable. Any desired degree of rigidity can be imparted to a splint by using this solution—the amount of rigidity depending upon the strength of the solution. Dextrine in the proportion of 8 ounces to the pint of water adds some tenacity besides stiffness. A splint made with its aid can be moistened with water and remolded—quite an advantage in many cases.

"In using this material the aim should be to get barely sufficient moisture to render the material semi-plastic. If more moisture is absorbed it becomes difficult to maintain the molded splint in the desired shape while drying, and it also unnecessarily lengthens the time required to dry it. The best manner of moistening the splint-blank is to apply the fluid used on each side of it alternately by means of a flat paste-brush. A little practice will enable one to judge the precise amount of moistening best suited to the purpose. The time required for drying the molded splints varies from ten to forty minutes, according to the thickness of the material used; any source of heat can be employed, a kitchen fire being serviceable and nearly always at hand.

"While drying the splint after it is molded to fit the part, it is well to wind a bit of yarn or string around it to aid in retaining its shape until it is sufficiently hard to keep its form."

He then describes in detail the application of splints made from this material to different portions of the body, including the head, the trunk, and the upper and lower limbs.

As I have only just recently received the material my personal knowledge of the technique is limited, but I can readily see the ease with which the sheets can be molded to fit inequalities in the limbs. The extreme lightness of the splint will be of the greatest service in many cases, and will be much more comfortable to the patient than the heavier and more cumbersome splints in common use. Then, too, by coating the splint with a silicate solution, it becomes impervious to moisture and can be washed daily with an antiseptic solution.

Dr. J. B. Roberts read a paper on

THYROIDECTOMY IN THE TREATMENT OF GOITRE.

(See page 754.)

DISCUSSION.

Dr. G. A. Muehleck: I have a case under observation at present with a well-marked hypertrophy goitre which I am treating after the method of Garé, which is practiced at Professor Bruns' clinic at Tübingen. It is the parenchymatous injection of iodoform in a solution of ether and olive oil, the proportions being seven grammes each of olive oil and ether and one gramme of iodoform. Under this treatment the measurements of the enlarged gland are diminishing rapidly. Garé published the clinical records of twenty-five to thirty cases in which this method was carried out with exceedingly gratifying results. I am speaking, however, only of the hypertrophic form.

Dr. Wm. J. Taylor asked if Dr. Roberts had noticed any especial respiratory difficulty or nervous shock in his operations when working near the sheath of the vessels of the neck or in deep dissection. In two cases coming under his observation which were being operated upon for goitre, everything seemed to be going on well, when suddenly during the dissection, in which there had been no hemorrhage of any account, the patient had some respiratory difficulty and rapidly sank, dying in a few hours without any obvious reason.

Dr. G. G. Davis: There are cases of goitre in which the tumor is not very deeply seated and does not go below the sternum and great vessels, so that it can be easily shelled out, and the hemorrhage is almost *nil*. In other cases the hemorrhage is very marked. I saw one case where the patient died upon the table from it. This happened in the hands of a surgeon of highest skill. Therefore I think that the seriousness of an operation depends upon the kind of case it is rather than the operation or the surgeon, and

accidents might happen in the hands of any one.

DR. SHOEMAKER: I was present at one of the operations reported, and was very much pleased with the skill of Dr. Roberts in managing the hemorrhage by carefully securing the bleeding vessels. It was one of those thyroids which are not very adherent, and did not descend much below the border of the sternum. The special point of interest to me was in seeing how easily such growths come out when skillfully attacked.

DR. DAVIS: If these were cases of intracapsular enucleation I would be much interested in hearing about the bleeding and how it was controlled. The substance of the thyroid gland and veins in these cases is so extremely friable that it is almost impossible to control the bleeding by the application of hemostats. They simply tear out; they will not hold at all. Dr. Wolff, of Germany, advocated the intracapsular enucleation of the enlarged thyroid gland, and the method he recommended was practically to bite away the growth piecemeal, controlling hemorrhage as you go along by means of pressure. It takes exceedingly skillful manipulation to perform a thyroidectomy without hemorrhage by such a method, and most of the other surgeons who discussed his paper preferred the ordinary method of Kocher.

DR. ROBERTS: I did not work inside the capsule, but principally outside. I cut down outside of the capsule and shelled out the tumor. The operation was extracapsular except where the capsule was accidentally cut through during the operation. Of course, the goitres are much less large with us than the goitres seen in Europe. In the greatly enlarged glands the vessels are increased in number and size, as well as the tissue elements. I have seen a comparatively large number of goitres at the Woman's Hospital, and I have refused to operate upon a good many of them. It seems to me, however, that where there is dyspnœa or pain from pressure upon the vessels or the nerves by the growth it is proper to operate. In many cases relief can be obtained by medicine, and if we can succeed in taking the patient's mind off from the goitre the enlarged gland will give less trouble. The cases reported, it appears to me, were proper ones for operation. With regard to Dr. Taylor's question, I have seen profound collapse during an operation upon the neck, although not in a case of goitre. There was sudden stoppage of breathing and serious circulatory disturbance. I found that I was making pressure upon the pneumogastric nerve; as soon as I relaxed it the breathing became normal.

Dr. Muehleck presented

A REPORT OF FOUR CASES OF DIPHTHERIA TREATED BY ANTITOXINE.

(See page 756.)

DISCUSSION.

DR. H. A. HARE: I had the honor of being invited to be present at the Municipal Hospital when the inoculations were made by Dr. Fischer, of New York; but think that I have very little to add to the report of Dr. Muehleck. There are, however, several things which impressed me very forcibly at the time of making these experiments, which I have not had time to clear up. One was that the cases were desperate ones, fairly rotten with sepsis; you could scarcely believe it possible that children could survive such profound poisoning. Some of them were simply gasping for air, not from obstruction but from prostration of the vital powers. Some had as much as 60 per cent. of albumin in the urine, the pulse was indistinct and could scarcely be found at the wrist; while the most careful auscultation was needed to distinguish the heart-sounds. Such cases were among those that received the injections, as I have said. What the result is it is too soon to say, but I was impressed with the thought that the test in these cases could only end in failure. If the treatment could be given at an early stage, before the kidneys, the heart and the other important organs had become so seriously involved, it may be useful. Dr. Fischer thought the cases desperate, but declared that the severe cases were the most favorable for the test. In one case he used an Aronson's solution, which was three times as strong as Behring's. I believe that one of the patients who received the antitoxine is still alive and in about the same condition; the other case I have not heard from.

Now if, as we all believe, diphtheria is primarily a local disease caused by infec-

tion with the bacillus whose growth causes the development of toxine, I am free to confess that I would rather take my chances with the toxine than to inject any amount of immunizing serum into my blood. The child has not only to struggle against the toxine of the Klebs-Loeffler bacillus, but also the toxines of the other bacilli, which cause so-called pseudo-diphtheria, and of the ordinary bacteria of inflammation and suppuration, and the use of antitoxine may, for all we know, increase the strain on the organism.

Dr. Carl Frese, from the German Hospital, by invitation, gave his experience with antitoxine. He said: I received some serum from Charles H. Meyer, German Consul in Philadelphia, directly from Behring. The first case it was tried upon was a case of Dr. Woodward's. It was in a family where three were attacked by diphtheria. The second case was the only one in which it was tried. The child was in a desperate condition and died thfee hours after the injection. We made cultures and found the Klebs-Loeffler bacillus, also staphylcocci and streptococci. The third child was just beginning to get sick, and nothing was seen in the throat of false membrane. In that case the child had been exposed to the infection. We used one-tenth of a bottle of the antitoxine, and the patient got well of her malaise without developing any membrane. Another case at the Municipal Hospital, by invitation of Dr. Welch, was very bad the fifth day of the disease, and he said that from his experience it would die. We gave it an injection of 1,000 normal units of the antitoxine, and the child is living yet, a week afterward. The last report was that the child was doing better, but the pulse was still weak. Another child, who had been brought in on the same day, he thought might not recover under ordinary treatment. This case was also treated with antitoxine and recovered. The mucus from the throat of each of the children was examined and found to contain the Klebs-Loeffler bacilli.

Dr. Edwin Rosenthal: There is nothing that interests me as much as the therapy of diphtheria; and it was with peculiar care that I followed the experiments of Dr. Muehleck as he described them to me, with their satisfactory results. In the statistics presented this evening on the treatment of diphtheria by antitoxine, the greatest proportion of recoveries was shown in cases where the treatment began on the first day of the disease. These statistics were classified peculiarly, and had reference to the number of days the patients were ill before the treatment was begun, as the first, second, third and fourth day of the disease. They had no reference to the gravity of the disease nor the complications. As such their value must in some way be diminished, for we all know that cases of diphtheria seen early enough can be so treated that the infection becomes modified and recoveries be the rule. For this reason the old method of treatment might be classed as equally good; and many a physician, notably my friend Dr. A. Klein, who has seen many cases of diphtheria, has a record of no deaths. I should believe that in those desperate cases —such a one as described by Dr. Hare—the real efficiency of antitoxine can be tested. But, nevertheless, the cases reported by Dr. Muehleck this evening have proved that its use prevents the full development of the disease, and if developed improves the gravity of the symptoms to a remarkable extent.

Regarding the statistics of the cases upon which tracheotomy was performed, I, for myself, cannot see anything remarkable, as I think the statistics of Dr. Wharton with the present plan of treatment equally as good; however, if with one or more injections of antitoxine the course of such cases can be shortened, we have assuredly a good remedy. In Dr. Muehleck's paper no mention was made of those cases of laryngeal diphtheria intubated and treated by antitoxine. All the statistics I have seen on this special subject have recorded no deaths—surely a record which places antitoxine foremost as a remedy. The first case in which Dr. Muehleck used the injections was one of laryngeal diphtheria, and I was present when he made his first injection, using the serum of Aronson, manufactured by Schering. Though the stenosis was marked, intubation was not practiced; and on the second night, when suffocation appeared imminent, Dr. Muehleck, at the suggestion of Dr. Klein, still postponed intubation, but gave a second injection; and this case recovered. This recovery was deemed by Dr. Muehleck due to the employment of

the remedy, for no other special means was employed; surely another demonstration proving its efficacy.

Last June I wrote to Sanitäls Rath, Dr. A. Baer, of Berlin, for some antitoxine. His position is such that it gives him peculiar opportunities to be well posted in sanitary matters. Through him, on a former occasion, I was enabled to receive a supply of Koch's tuberculine, and probably the result of those experiments prompted him to write me to wait further development. On the 2d of October I received a letter from him in which he wrote me that the excellent monographs presented at the International Hygienic Congress at Pest and the Naturwissenschaftliche Versammlung at Vienna have pronounced in favor of the antitoxine, so its usefulness may be regarded as established.

Dr. A. Klein: The cases referred to by the last speaker were mostly mild cases and would have recovered under any ordinary treatment. The cases I have seen with Dr. Muehleck were of a different type entirely. In the first one, stenosis was so marked that intubation or tracheotomy was considered, but in order to give the antitoxine a fair trial we decided to give a second injection and to wait with surgical interference till the symptoms would grow more urgent. The case as reported got well.

In addition to the statistics referred to to-night which are in favor of antitoxine, I would mention 35 cases treated by Dr. Bokai in Budapest with antitoxine *exclusively*, of which 19 were of the most severe type; 16 of them had to be intubated. Of the 35 cases 8 died; of the intubated ones all recovered.

The *Medical News* (November 17, 1894) reports another case of diphtheria of the most severe type, with extensive membranous deposits all over the pharynx, treated with antitoxine by Dr. Catlin, of Brooklyn, which recovered. In this case the Klebs-Loeffler bacillus was found twenty-one days after the recovery.

Dr. D. Braden Kyle: I can add nothing to the observations already stated as to the clinical effects of antitoxine, but I might add something in regard to the examination of cases for the bacilli. What has been said in regard to the presence of other organisms is quite true. In all the cases I have studied where streptococci were present the case was more malignant than if the staphylococci were found; as a rule, many germs are present besides the Klebs-Loeffler bacillus. The germ of false diphtheria (von Hoffmann's) is so much like the germ of true diphtheria that it may be necessary to resort to the inoculation of animals to make the diagnosis. Inoculations made on blood-serum and incubated, the first growth to appear on the surface of the serum is, as a rule, the Klebs-Loeffler, and in most cases the diagnosis can be based on stains from these growths; only in the older cultures is there any marked difference.

The serum of Aronson is of several strengths: one preparation labeled diphtheria antitoxine is not intended for treatment of diphtheria, but for the purpose of immunization. At the request of Dr. Morton I have with me a number of microscopic slides showing the germs from tubes eighteen hours after inoculation and also from older growth, from which the marked variance in form can be observed. These are now ready for examination.

Dr. T. Xaine: With regard to the so-called pseudo-bacillus I would remark that some German pathologists deny that there is any difference. Some French authorities, on the other hand, affirm that there is a distinction, that the pseudo-bacillus is shorter and grows more rapidly in cultured media. It is also asserted that it may be found in the throat during perfect health, and in the throats of individuals living in communities where there never had been diphtheria. It is said that the pseudo-bacillus is found in 15 or 20 per cent. of healthy children, and that the virulent bacillus may lose its virulence, but by culture in suitable media this may be restored. Four days ago I injected into the trachea of a rabbit 1 c.c. of a solution of the Klebs-Loeffler bacillus bouillon culture. The rabbit had symptoms of dyspnœa yesterday. He had a beautiful membrane throughout the larynx down to the bifurcation of the trachea. On making cultures of the bacilli I found that they had regained their virulence and former thickness. I think that in New York they do not recognize any distinction between the true and false diphtheritic bacillus, and consider them all as diphtheria germs. I think that Dr. Abbott also does not believe that there is any difference between the true and false diph-

theria bacillus. As regards streptococci and staphylococci, they are always found in the mouth and their presence only indicates a double infection.

DR. MUEHLECK: I think that every experienced physician will agree with me that there are very few chapters in medicine more disappointing than the treatment of diphtheria. In fact, the treatment until now has amounted to very little, it being always a question, in my mind, whether the patient was not more injured than benefited by the attempt to make applications of disinfecting solutions to the throat in a struggling child with a weak heart. The results from surgery have been even more desperate. Anything, therefore, that will afford a ray of hope should be welcomed with delight. The cases I have seen are too few for conclusive opinion, but the results from Europe are very favorable. Virchow, who is usually very conservative in such matters, has indorsed this treatment. The prognosis depends largely upon the day of the disease when the treatment is begun, as I have already said in my paper. Behring and Prudden have shown that sepsis by streptococcus invasion is common in the later stage of the disease. The formula distinctly states that the antitoxine is powerless against such infection.

AUTO-INFECTION.

The subject of auto-infection is one which the physician may study with great profit, both to himself and to his patients. It is the direct offspring of bacteriology, but is not, by any means, the first time error has given birth to truth.

By auto-infection we mean the pathological manifestations brought about by the formation and retention of poisons within the system; and to thoroughly understand the subject we find necessary a knowledge of the normal chemistry and physiology of the body.

In perfect health a certain percentage of poisonous excreta is formed, and this the organism can safely dispose of within certain limits; but when, through unhygienic living, this percentage is daily increased, the depurative and eliminating organs become paralyzed and later diseased through overwork, and we have the supervention of various pathological phenomena from the accumulation of poisons in the system.

Thus it is with Bright's disease. A man appears in fair health. He is attending to his business and seldom complains. His blood contains more than the normal percentage of poisons; his liver and kidneys have been laboring for the past year or more to discharge this additional work; they are almost exhausted and the man is in the position of a boiler about to explode. He has had some warning because nature is just, although severe.

He has had frequent dyspeptic attacks to which he paid no heed; he has suffered from violent headaches, painful vision; he is breathless upon slight exertion, his heart wobbles uncomfortably; his hair has begun to fall, perhaps, but what of it? He is forty-five or fifty years of age and these are the inevitable, if unpleasant, concomitants of coming age.

And so the explosion comes. Monday he is seen on the street; Saturday he is dead. The physicians assure the grief-stricken family and friends that the disease had been coming on a year or more and had gone beyond medical aid; that had he consulted them earlier he might have been saved.

This is poor consolation, but it is true. Doctor, educate your patients, educate yourself. Teach them to come to you early before a disease has gone beyond the resources of medicine, and study the subject of auto-infection to its utmost ramifications; you will find in it the source of two-thirds of the diseases, if not all. Its manifestations will vary with the nature of the poison, its quantity, the age, condition, vital resistance of the patient, etc., and the chief problem will be to ascertain the influential factors in each individual case.

PERISCOPE.

IN CHARGE OF WM. E. PARKE, A.M., M.D.

MEDICINE.

Growing Pains.

Growing pains, defined as pains in the limbs caused by and during rapid growth and sometimes so severe as to give rise to growing fever, have been diagnosed by the author less and less frequently as the years rolled by, until the vanishing-point was reached. Cases which have been classed together under this name are the following:

Myalgia from Fatigue.—This is the commonest variety, usually about the knees and ankles after unusual exertion. They are probably due to auto-infection brought about by excessive production of *effete* materials in the blood and their inefficient elimination. Elevating the limbs and rubbing with the palm of the hand in a direction toward the heart, relieving venous stasis and facilitating a supply of healthy blood to the exhausted muscles, promptly relieves the pain.

Rheumatism.—This is second, if not first, in frequency. There is slight pain in the joints, little or no swelling, and very mild fever, and hence the true cause is not recognized; but rheumatic endocarditis frequently develops in these cases.

Diseases of Joints and Bones of the Lower Extremities.—Cases of hip-joint disease and suppurative epiphysitis of the upper end of the fibula, diagnosed by the laity and allowed to go on untreated, are related under this heading

Fevers, accompanied by pains in the limbs, in one instance proving to be inception of typhoid fever, constitute this class.

Adenitis.—Here, again, the mother still supposes that the lad of sixteen years suffered from "growing pains," but he was treated for gonorrhœa and a sympathetic bubo.

The malady "growing pains," with its frequent concomitant growing fever, like its congener disorders of dentition, as a separate morbid entity exists principally as an article of faith. The complaint still maintains, however, a strong hold of the lay mind, and forms an extremely common lay diagnosis which is often the cause of much suffering, and even death, by leading to the neglect of curative measures at a time when they are most effective.—*P. B. Bennie in Arch. Pediatrics.*

Neebe's Treatment of Sweating Feet by Crude Hydrochloric Acid.

When the feet are very tender, especially in hot weather, treatment is preceded by an eight to ten days' application of talc powder, which is sprinkled in the stockings. The application of the acid is made in the evening. The crude hydrochloric acid is poured into a flat vessel of stone or glass or porcelain sufficiently large to receive the two feet. Since the soles of the feet and the skin between the toes are the seat of the trouble, sufficient hydrochloric acid is poured into the vessel to completely cover the soles. It should not be allowed to come in contact with the skin of the back of the feet. The heel is kept in the acid for five minutes; then the sole of the foot for ten minutes. After this the feet, especially the skin between the toes, are washed in soap and warm water. Soaking in the acid must be at once stopped as soon as pain is excited, and the painful spots must be treated with zinc ointment until healing is complete. The process of soaking may be repeated twice weekly, and continued for from five to eight weeks in obstinate cases.—*Med. Press and Circular.*

Treatment of Croupous Pneumonia.

Kiad, in a paper published in *The Practitioner*, confines his remarks to two remedies—opium and strychnine. He says that to him the only definite contraindication to the use of opium is furnished by symptoms of impending exhaustion of the respiratory center—shallow, labored respiration, drowsiness and a tendency to cyanosis. While not a drug to prescribe in a routine way, it is not denied that excellent results may be adduced in favor of such a practice. The chief indications for giving opium, with the reservation just mentioned, seems to be severe pain that cannot be controlled by other measures, insomnia, restlessness and delirium. While it is not claimed that these symptoms should always be treated by opium, they may be often effectually and always safely so treated at any stage of the disease. The drug is generally best given in one full dose at bedtime—say 10 grains of Dover's powder or $\frac{1}{4}$ to $\frac{1}{2}$ grain of morphine hypodermatically. Under this treatment, which was in some cases continued from the beginning of the attack to the crisis, the number of respirations was generally reduced by ten or twelve in the minute, the pulse being either unaffected or exhibiting a transitory reduction in the number of beats. No marked effect on the expectoration could be traced. In the use of strychnine he supports the views of Habershon, who holds that its efficacy is due to its action being exerted on the excito-motor-nerve apparatus of the heart and on the respiratory center. The action of strychnine brings indirect support to the view that in pneumonia what we have to fear is the influence of toxines on the nervous system. On this hypothesis cardiac failure is only an expression of exhaustion of the nerve centers and is therefore an indirect effect of the poison. It is best given hypodermatically directly into the gluteal muscles in doses of $\frac{1}{60}$ grain, the indications for its use being derived from the pulse. If the tension begins to sink or if the

frequency of the beats is much increased, it should be tried at once. Its good effect on the pulse and the respiration is often manifested in ten or fifteen minutes. When the rally is not maintained the above dose may be repeated every two hours until three or four doses have been given, and then o nce or twice in the twenty-four hours until the pulse and respiration right themselves. In the treatment of delirium strychnine often acst more beneficially than alcoholic stimulation.

PATHOLOGY.

Clinical Value of Renal Casts.

Many clinicians can recognize casts under the microscope but fail to interpret their significance. Dr. A. E. Austin, in the *International Medical Magazine*, separates them into definite groups and draws inferences accordingly. The hyaline and blood casts merely indicate irritation and hyperemia. Closely associated with hyaline casts is amyloid change of the kidney due usually to suppuration and with a good prognosis if the source of suppuration be removed. Epithelial, granular and fibrinous casts indicate acute inflammation of the renal tubules, the epithelial cast pointing to the mild stage; that is, one of mere desquamation with urine slightly under normal in amount, specific gravity 1030, high color, albumen a trace, numerous hyaline casts, free blood and renal epithelium. This may go on to brown or pale granular casts with diminution of the solids of the urine. The fatty and waxy casts when numerous and persistent indicate long-continued chronic inflammation of the kidney with bad prognosis. Blood and epithelial cells are absent. In this case the urine is diminished in amount with increased specific gravity. The pale, granular and small hyaline casts point to fibroid kidney. Aside from the microscopical appearance, the general condition of the patient, age, sex and previous history must be taken into consideration. It should be remembered that the diagnosis of casts alone may mean little, but the kind of casts in abundance is the important point.

The Causes of Narcosis-Paralysis.

Under the name narcosis-paralysis, or pressure-paralysis, the Germans group those cases which occur after narcosis, or long-continued lying in one position. Primary cause: They occur most frequently in the arm after operations, during which the limb has been kept elevated for long at a time. Braun has considered them to be due chiefly to the clavicle pressing the brachial plexus against the vertebral column, and to the direct pressure of the head of the humerus on the nerves. More recently Gaup (*Centralblatt f. Chirurgie*) has claimed that the nerves are compressed between the clavicle and the first rib; possibly also, in certain cases, between the clavicle and the scalenus muscle. In any event, the occurrence of these cases is a warning not to keep the limbs in constrained positions any longer than is necessary during operations. Pernice reports a case where a paralysis of the radial nerve, lasting, unimproved, till the patient's death (three weeks), occurred, probably from the forearm happening to lie against the edge of the table at the point where the nerve turns around it.

Menstruation and Infection.

The connection between erysipelas and infectious peritonitis has long been considered intimate, and there is now good ground for the belief that from a bacteriological point of view the two diseases are identical. In the *Presse medicale* for September 29th there is an interesting communication from Dr. Henri Meunier, a hospital interne, giving an account of a fatal case of peritonitis which suddenly attacked a healthy young girl under somewhat peculiar circumstances. She was a domestic servant, and her mistress was seized with severe facial erysipelas. The young girl took an active part in nursing the sick lady, was almost constantly at her bedside, and personally attended to changing the applications to her face. While this was going on the girl's menstrual flow appeared and she committed the imprudence of using as a menstruous napkin a cloth that had been used in a dressing for the lady's face. She was suddenly seized with a violent chill while out for a walk, also with malaise, head ache, general depression, and soon repeated vomiting. Her courses, which had appeared two days before, were brusquely suppressed. Her death followed in the course of five days, and the post-mortem examination showed conclusively that the disease could have had no other origin than by infection from the napkin. The case is recorded with all the details, and the author's remarks on it are well worth reading in full.

DIETETICS.

Home-Made Beef-Powder and How to Prepare It.

Dr. William R. Huggard (Davos Platz, Switzerland) writes in the *British Medical Journal:* Some of the beef powders in the market smell and taste of the chemist's shop, and are not readily taken by an invalid whose palate requires to be coaxed. A happy idea struck the writer several months ago that beef-powder might without difficulty be prepared fresh and on a small scale by any ordinary cook. The experiment was made, and the result was satisfactory beyond expectation. Beef-powder made at home is appetizing, has a delicate aroma and flavor, and can be taken with pleasure by invalids who turn with aversion from ordinary food. If a little pepsin be taken at the same time, it is digested even when the ordinary peptonized foods are not retained.

The mode of preparation is simple. Lean beef is cut into small pieces; these are put into boiling fat, dripping, or butter for a couple of minutes until the surface is browned. They are then removed from the fat and placed on a strainer for a few moments. Afterward they are placed in a mincing-machine. The resulting mince is placed in a slow oven and dried. The drying process may take from five to twenty-four hours, or even longer, according to the heat employed. When thoroughly dried the meat is quite crisp, and can be ground in a coffee-mill that has not been used for any other purpose. In the drying process the meat loses a trifle more than four-fifths of its weight. This beef-powder can be taken in various ways—with hot water or soup, with mashed potatoes, with bread and butter in a sandwich, or with a little pepsin in a starch wafer. The writer has given this home-made beef-powder with such excellent effect in several cases where there was much difficulty with food that he thinks others may find it useful.

Beef-powder, carefully prepared according to the directions above given, has an agreeable flavor, and admits of being used like potted meat by persons of delicate or fanciful appetite. By regulating the heat applied in making the powder the albuminous constituents need not be coagulated, but merely dried, and the digestibility of the powder would then be increased; in any case, the finely divided condition would facilitate digestion. A very good beef-tea may be made from the powder by infusing it in moderately hot water. For the preservation of the powder it would be necessary to keep it from contact with atmospheric air and to avoid the access of mites or similar deteriorating influences.

Boiled Milk as an Aliment Abroad.

The practice of subjecting milk to boiling heat before consumption has been widely adopted in European countries, whose public hygiene has hitherto been such as to counsel every means of minimizing the conveyance of infection. British travelers, in Latin countries especially, will be reassured by this salutary innovation, experience having taught them that the milk supplied in hotels and pensions and added to their morning meal of tea and coffee has too often been tainted with the micro-organisms of infectious or contagious disease, chiefly from being diluted with impure water, not seldom containing the desquamatory *debris* of convalescents from scarlet fever. Sanitary truth progresses slowly into these regions, and when the public health officer at length succeeded in establishing the unwelcome fact that milk was one of the surest channels by which infectious diseases were diffused, he had to encounter the objection that the boiling process to which he insisted on its being subjected deprives it of its nutrient properties and also its digestibility. Again, however, he has been able to show that reason was on his side, and that milk after boiling is not only more easily digested, but has actually a higher nutrient value than in the crude state. We allude especially to Dr. Chamouin's experiments, in which he fed a number of kittens on boiled milk and an equal number of kittens on the same milk as it came direct from the cow or goat. Those of the former category he found to be twice as fat and healthy as those of the latter. Following up this demonstration, Dr. Chamouin examined the statistics officially issued by the town council of Paris as to the infantile mortality of that city, and finding that the chief cause of this was, directly or remotely, intestinal ailments, he prosecuted his researches still further, so as to include a comparison between those infants that had been fed on boiled and those that had been fed on unboiled milk. As he anticipated, he found a remarkable diminution in the death-rate of the former. His investigation was continued long enough to show that thousands of infants are annually safeguarded from intestinal disease and death by the precaution of boiling the milk on which they are fed.—*London Lancet.*

SURGERY.

Sterilization of Catgut by Boiling in Olive Oil.

Eastman (*Annals of Surgery*) experimented with the sterilization of catgut by means of hot olive oil. The following are his conclusions: Catgut can be rendered sterile by heating in oil to a temperature of 212° F. for three hours. The method is reliable, cheap and rapid. The quality is not impaired, and gut so treated is more satisfactory as to strength and smoothness than if subjected to the ether-alcohol-bichloride process. A higher temperature than 212° F. is not necessary for sterilization and is an injury to the gut. The material should be wound on reels or cylinders and not on anything with sharp edges.

Antipyrin as a Vesical Analgesic.

Vigneron (*Annales des Maladies des Organes Genito-Urinaires*) is convinced from its employment in three cases that antipyrin will prove to be a valuable vesical analgesic. Injected into the bladder the remedy is free from harmful effects, even when employed over a protracted period. As an antiseptic the author believes it to be superior to solutions of boric acid. When the solution of antipyrin is allowed to remain in the bladder, it not only relieves the pain but checks spasmodic contractions. A 4 per cent. solution left in the bladder for ten minutes is sufficient to diminish the pain attending subsequent washing or instillation. Antipyrin may be employed in all cases of cystitis in which local treatment induces pain. When the bladder is not distended, two and a half to five drachms of a 4 per cent. solution, left in the bladder for ten minutes, is sufficient. When the bladder is much distended, fifteen to thirty drachms of a 1 or ½ per cent. solution should be injected and allowed to remain in the bladder.

HYGIENE.

The Nose and Its Hygienic Relation to the Body.

It is no unusual thing to give advice to our fellow-man. To prevent his doing what he is impelled to do by force of nature or of habit, without showing him a better or, rather, the true way of relief, is virtually improper. In this connection the following is suggested: Each human being who claims any moderate amount of cleanliness and care regarding his health will, during his morning ablutions, wash his face, head, mouth, teeth and body, and may do so without ever dreaming that the human proboscis is one of the most uncleanly organs of the body (which fact our forefathers sought to overcome by the use of snuff, etc., but which proved of no avail), and its purification lies, last but not least, in washing the nostrils proper, and this should be done in the following way:

After the completion of the above ablutions and the thorough renovation of the basin used, fill it nearly full of pure cold water; immerse the whole face therein, and by trial learn how to gently snuff water as one would customarily breathe air; a few sniffs may be taken and the face withdrawn if the taking of breath has become necessary, and again immersing the face, repeat the action several times, but mark you, no force must be used. The result will speak for itself in the residue left in the basin, thus proving the necessity for removing the surplus secretions of this organ and avoiding the dangerous necessity of carrying your catarrhal as well as tuberculoid matter in your pocket, not mentioning the sometime contagious results from the laundering of handkerchiefs. The mucous surfaces of the nose thus become accustomed to the influence of the daily temperature by using the water in its normal condition, and many years of practical experience by its disciples has fully demonstrated the efficiency of this system.

All persons subject to catarrh who practically have dry and clear nostrils nevertheless have mucal droppings into the throat, and are often involuntarily compelled to swallow this retroverted mucus.

All this can easily be overcome by the permanent adoption of this system of cleanliness. The strong snuffing up and down of water in the nostrils is too forcible for that sensitive organ of smell, and no nasal douche should ever be used for the same reason. The above gentle flushing system is confidently urged as the most efficient and least harmful method of cleansing the nostrils.—*Herald of Health.*

PHYSIOLOGY.

Anti-Toxic Action of the Liver.

It has been established for some time, says the London *Lancet*, that the liver has a power of retaining certain poisonous alkaloids in high proportion and in their most active state when injected into the circulation. Dr. Schupfer, of the University of Rome, Italy, has now shown by experiments on frogs that by intrinsic action due to the specific activity of its cellules the organ diminishes the toxic power of the alkaloids with which it is brought in contact, not only those introduced from without, but those elaborated within the body, as from disease. The importance of a normally working liver is thus more apparent than ever.

OBSTETRICS.

Treatment of Early Abortion.

A conservative treatment of early abortion is recommended by Schauta, of Vienna, in a recent article. The old rule that pain and hemorrhage combined mean inevitable abortion he does not indorse, and thinks the accident preventable as long as the hemorrhage is not excessive or the cervix dilated. He does not try to check the bleeding and trusts to rest, which is continued for eight days after the last bleeding. In those cases where the os dilates and abortion becomes inevitable, he tampons with a strip of iodoform gauze about two yards long and the width of three or four fingers' breadth. He prefers to retract the perineum with the fingers of the other hand instead of using the speculum, and renews the tampon at the end of twenty-four hours at the least, removing it sooner if the appearance of sacral pains indicates that the ovum has been expelled from the womb. This method of treatment is in sharp contrast to the radical advice so often given of late to go in at once and curette out the womb as soon as an abortion becomes inevitable—a practice which Schauta objects to because of the danger of leaving fragments of membrane behind.—*Western Lancet.*

ARMY AND NAVY.

CHANGES IN THE U. S. ARMY FROM NOVEMBER 18, 1894, TO NOVEMBER 24, 1894.

The leave of absence granted Captain Adrian S. Polhemus, Assistant Surgeon, is changed to leave of absence on account of sickness, and is further extended to include December 26, 1894, on surgeon's certificate of disability.

NEWS AND MISCELLANY.

Routes and Rates to Winter Resorts.

The B. & O. R. R. Co. has just issued a little booklet giving the routes and rates to various winter resorts in Cuba, Florida, North Carolina, Virginia, New Jersey, Pennsylvania and Georgia. The information is very conveniently arranged and indexed. Copies can be had by inclosing a two-cent stamp to Chas. O. Scull, Gen'l Pass. Agent B. & O. R. R., Baltimore, Md.—2t